External Packages

Release 10.0

The Sage Development Team

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- *alabaster:* Default theme for the Sphinx documentation system
- *appdirs:* A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
- *appnope:* Disable App Nap on macOS >= 10.9
- *arb:* Arbitrary-precision floating-point ball arithmetic
- *argon2_cffi:* The secure Argon2 password hashing algorithm
- *argon2_cffi_bindings:* Low-level CFFI bindings for Argon2
- *asttokens:* Annotate AST trees with source code positions
- *attrs:* Decorator for Python classes with attributes
- *babel:* Internationalization utilities for Python
- *backcall:* Specifications for callback functions
- *backports_zoneinfo:* Backport of the standard library zoneinfo module
- *beautifulsoup4:* Screen-scraping library
- *beniget:* Extract semantic information about static Python code
- *bleach:* An HTML-sanitizing tool
- *boost_cropped:* Portable C++ libraries (subset needed for Sage)
- *brial:* Boolean Ring Algebra implementation using binary decision diagrams
- *bzip2:* High-quality data compressor
- *cddlib:* Double description method for polyhedral representation conversion
- *certifi:* Python package for providing Mozilla’s CA Bundle
- *cffi:* Foreign Function Interface for Python calling C code
- *charset_normlizer:* The Real First Universal Charset Detector. Open, modern and actively maintained alternative to Chardet.
- *cliquer:* Routines for clique searching
- *cmake:* A cross-platform build system generator
- *combinatorial_designs:* Data from the Handbook of Combinatorial Designs
• contourpy: Python library for calculating contours of 2D quadrilateral grids
• conway_polynomials: Tables of Conway polynomials over finite fields
• cppy: C++ headers for C extension development
• curl: Multiprotocol data transfer library and utility
• cvxopt: Python software for convex optimization
• cycler: Composable cycles
• cypari2: Python interface to the number theory library libpari
• cysignals: Interrupt and signal handling for Cython
• cython: C-Extensions for Python, an optimizing static compiler
• dateutil: Extensions to the standard Python module datetime
• decorator: Python library providing decorators
• defusedxml: Addresses vulnerabilities of XML parsers and XML libraries
• deprecation: A library to handle automated deprecations
• distlib: Distribution utilities
• docutils: Processing plaintext documentation into useful formats, such as HTML or LaTeX
• ecl: An implementation of the Common Lisp language
• eclib: Enumerating and computing with elliptic curves defined over the rational numbers
• ecm: Elliptic curve method for integer factorization
• editables: Editable installations
• elliptic_curves: Databases of elliptic curves
• entrypoints: Discover and load entry points from installed Python packages
• executing: Get the currently executing AST node of a frame, and other information
• fastjsonschema: Fastest Python implementation of JSON schema
• fflas_ffpack: Dense linear algebra over word-size finite fields
• filelock: A platform independent file lock
• flint: Fast Library for Number Theory
• flit_core: Distribution-building parts of Flit. See flit package for more information
• fonttools: Tools to manipulate font files
• fplll: Lattice algorithms, including LLL with floating-point orthogonalization
• fpylll: Python interface for FPLLL
• freetype: A free, high-quality, and portable font engine
• furo: A clean customizable Sphinx documentation theme
• gap: Groups, Algorithms, Programming - a system for computational discrete algebra
• gast: Python AST that abstracts the underlying Python version
• gc: The Boehm-Demers-Weiser conservative garbage collector
• gcc: The GNU Compiler Collection or other suitable C and C++ compilers
• gengetopt: getopt_long parser generator
• gf2x: Fast arithmetic in GF(2)[x] and searching for irreducible/primitive trinomials
• gfan: Groebner fans and tropical varieties
• gfortran: Fortran compiler from the GNU Compiler Collection
• giac: A general purpose computer algebra system
• givaro: C++ library for arithmetic and algebraic computations
• glpk: GNU Linear Programming Kit
• gmp: Library for arbitrary precision arithmetic
• gmpy2: Python interface to GMP/MPIR, MPFR, and MPC
• gnulib: Modules imported from GnuLib
• graphs: A database of combinatorial graphs
• gsl: The GNU Scientific Library
• hatch_fancy_pypi_readme: Fancy PyPI READMEs with Hatch
• hatch_nodejs_version: Hatch plugin for versioning from a package.json file
• hatch_vcs: Hatch plugin for versioning with your preferred VCS
• hatchling: Modern, extensible Python build backend
• html5lib: An HTML parser
• iconv: Library for language/country-dependent character encodings
• idna: Internationalized Domain Names in Applications (IDNA)
• imagesize: Parser for image file metadata
• iml: Integer Matrix Library
• importlib_metadata: Library to access the metadata for a Python package
• importlib_resources: Read resources from Python packages
• ipykernel: IPython Kernel for Jupyter
• ipython: Interactive computing environment with an enhanced interactive Python shell
• ipython_genutils: Vestigial utilities from IPython
• ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
• jedi: Static analysis tool providing IDE support for Python
• jinja2: General purpose template engine for Python
• jmol: Java viewer for chemical structures in 3D
• jsonschema: Python implementation of JSON Schema
• jupyter_client: Jupyter protocol implementation and client libraries
• jupyter_core: Jupyter core package
• jupyter_ismol: JSmol viewer widget for Jupyter
• jupyter_packaging: Jupyter Packaging Utilities
• jupyter_sphinx: Jupyter Sphinx Extension
• jupyterlab_pygments: Pygments theme using JupyterLab CSS variables
• jupyterlab_widgets: Jupyter interactive widgets for JupyterLab
• kiwisolver: An implementation of the Cassowary constraint solving algorithm
• lcalc: L-function calculator
• libatomic_ops: Access hardware-provided atomic memory update operations
• libbraiding: Computing with braids
• libffi: A portable foreign-function interface library
• libgd: Dynamic graphics generation tool
• libhomfly: Compute the homfly polynomial of knots and links
• liblzma: General-purpose data compression software
• libpng: Bitmap image support
• linbox: Linear algebra with dense, sparse, structured matrices over the integers and finite fields
• lrcalc: Littlewood-Richardson calculator
• lrcalc_python: Littlewood-Richardson calculator
• m4ri: fast arithmetic with dense matrices over GF(2)
• m4rie: Arithmetic with dense matrices over GF(2^e)
• markupsafe: Safely add untrusted strings to HTML/XML markup
• mathjax: A JavaScript library for displaying mathematical formulas
• matplotlib: Python 2D plotting library
• matplotlib_inline: Inline Matplotlib backend for Jupyter
• maxima: System for manipulating symbolic and numerical expressions
• memory_allocator: An extension class to allocate memory easily with Cython
• meson: A high performance build system
• meson_python: Meson Python build backend (PEP 517)
• mistune: A markdown parser in pure Python
• mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
• mpfi: Multiple precision interval arithmetic library based on MPFR
• mpfr: Multiple-precision floating-point computations with correct rounding
• mpmath: Pure Python library for multiprecision floating-point arithmetic
• nauty: Find automorphism groups of graphs, generate non-isomorphic graphs
• nbclient: A client library for executing notebooks. Formerly nbconvert’s ExecutePreprocessor.
• nbconvert: Converting Jupyter Notebooks
• nbformat: Base implementation of the Jupyter notebook format
• ncurses: Classic terminal output library
• nest_asyncio: Patch asyncio to allow nested event loops
• networkx: Python package for complex networks
• **ninja_build**: A build system with a focus on speed
• **notebook**: Jupyter notebook, a web-based notebook environment for interactive computing
• **ntl**: A library for doing number theory
• **numpy**: Package for scientific computing with Python
• **openblas**: An optimized implementation of BLAS (Basic Linear Algebra Subprograms)
• **openssl**: Implementation of the SSL and TLS protocols
• **packaging**: Core utilities for Python packages
• **palp**: A package for Analyzing Lattice Polytopes
• **pandocfilters**: A Python module for writing pandoc filters
• **pari**: Computer algebra system for fast computations in number theory
• **pari_galdata**: PARI data package needed to compute Galois groups in degrees 8 through 11
• **pari_seadata_small**: PARI data package needed by ellap for large primes (small version)
• **parso**: A Python parser
• **patch**: Applies diffs and patches to files
• **patchelf**: A small utility to modify the dynamic linker and RPATH of ELF executables
• **pathspec**: Utility library for gitignore style pattern matching of file paths.
• **pexpect**: Python module for controlling and automating other programs
• **pickleshare**: A ‘shelf’ like datastore with concurrency support
• **pillow**: Python Imaging Library
• **pip**: Tool for installing and managing Python packages
• **pkgconf**: An implementation of the pkg-config spec
• **pkgconfig**: Python interface to pkg-config
• **planarity**: Planarity-related graph algorithms
• **platformdirs**: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
• **pluggy**: plugin and hook calling mechanisms for python
• **ply**: Python Lex & Yacc
• **poetry_core**: Poetry PEP 517 Build Backend
• **polytopes_db**: Databases of 2- and 3-dimensional reflexive polytopes
• **ppl**: Parma Polyhedra Library
• **pplpy**: Python interface to the Parma Polyhedra Library
• **pplpy_doc**: Python interface to the Parma Polyhedra Library (documentation)
• **primecount**: Algorithms for counting primes
• **primecountpy**: Cython interface for C++ primecount library
• **primesieve**: CLI program and C/C++ library for generating primes
• **prometheus_client**: Python client for the systems monitoring and alerting toolkit Prometheus
• **prompt_toolkit**: Interactive command lines for Python
• ptyprocess: Python interaction with subprocesses in a pseudoterminal
• pure_eval: Safely evaluate AST nodes without side effects
• py: library with cross-python path, ini-parsing, io, code, log facilities
• pybind11: Create Python bindings to C++ code
• pycparser: Parser of the C language in Python
• pycygwin: Python bindings for Cygwin’s C API
• pygments: Generic syntax highlighter
• pyparsing: A Python parsing module
• pyproject_metadata: PEP 621 metadata parsing
• pyrsistent: Persistent data structures in Python
• python3: The Python programming language
• pythran: Ahead of Time compiler for numeric kernels
• pytz: Timezone definitions for Python
• pytz_deprecation_shim: Shims to make deprecation of pytz easier
• pyzmq: Python bindings for the zeromq networking library
• qhull: Compute convex hulls, Delaunay triangulations, Voronoi diagrams
• readline: Command line editing library
• requests: An HTTP library for Python
• rpy2: Python interface to R
• rw: Compute rank-width and rank-decompositions
• sage_conf: Configuration module for the SageMath library (distributable version)
• Sage: Open Source Mathematics Software: Build system of the Sage documentation
• sage-setup: Build system of the SageMath library
• sagemath_doc_html: SageMath documentation in HTML format
• sagenb_export: Convert legacy SageNB notebooks to Jupyter notebooks and other formats
• sagetex: Embed code, results of computations, and plots from Sage into LaTeX documents
• scipy: Scientific tools for Python
• send2trash: Send file to trash natively under Mac OS X, Windows and Linux
• setuptools: Build system for Python packages
• setuptools_scm: Python build system extension to obtain package version from version control
• setuptools_scm_git_archive: setuptools_scm plugin for git archives
• setuptools_wheel: Build the setuptools package as a wheel
• simplegeneric: Simple single-dispatch generic functions for Python
• singular: Computer algebra system for polynomial computations, algebraic geometry, singularity theory
• six: Python 2 and 3 compatibility utilities
• snowballstemmer: Stemmer algorithms for natural language processing in Python
• `soupsieve`: A modern CSS selector implementation for Beautiful Soup.
• `sphinx`: Python documentation generator
• `sphinx_basic_ng`: A modern skeleton for Sphinx themes.
• `sphinx_copybutton`: Add a copy button to each of your code cells.
• `sphinxcontrib_applehelp`: Sphinx extension which outputs Apple help book
• `sphinxcontrib_devhelp`: Sphinx extension which outputs Devhelp documents
• `sphinxcontrib_htmlhelp`: Sphinx extension which outputs HTML help book
• `sphinxcontrib_jsmath`: Sphinx extension which renders display math in HTML via JavaScript
• `sphinxcontrib_qthelp`: Sphinx extension which outputs QtHelp documents
• `sphinxcontrib_serializinghtml`: Sphinx extension which outputs serialized HTML files
• `sphinxcontrib_websupport`: Sphinx API for Web apps
• `sqlite`: An SQL database engine
• `stack_data`: Extract data from python stack frames and tracebacks for informative displays
• `suitesparse`: A suite of sparse matrix software
• `symmetrica`: Library for representation theory
• `sympow`: Computes special values of symmetric power elliptic curve $L$-functions
• `sympy`: Python library for symbolic mathematics
• `tachyon`: A ray tracing system
• `terminado`: Tornado websocket backend for the term.js Javascript terminal emulator library
• `threejs`: JavaScript library to display 3D graphics in the browser
• `tinycss2`: A tiny CSS parser
• `toml`: Python Library for Tom’s Obvious, Minimal Language
• `toml`: A lil’ TOML parser
• `tomlkit`: Style preserving TOML library
• `tornado`: Python web framework and asynchronous networking library
• `tox`: tox is a generic virtualenv management and test command line tool
• `traitlets`: Traitlets Python configuration system
• `typing_extensions`: Backported and Experimental Type Hints for Python 3.5+
• `tzdata`: Provider of IANA time zone data
• `tzlocal`: Python time zone information for the local timezone
• `urllib3`: HTTP library with thread-safe connection pooling, file post, and more.
• `vcversioner`: Python build system extension to obtain package version from version control
• `virtualenv`: Virtual Python Environment builder
• `wcwidth`: Measures the displayed width of unicode strings in a terminal
• `webencodings`: Character encoding aliases for legacy web content
• `wheel`: A built-package format for Python
• widgetsnbextension: Jupyter notebook extension for interactive HTML widgets
• xz: General-purpose data compression software
• zeromq: A modern networking library
• zipp: A pathlib-compatible zipfile object wrapper
• zlib: Data compression library
CHAPTER TWO

OPTIONAL PACKAGES

For additional functionality, you can install some of the following optional packages.

- **4ti2**: Algebraic, geometric and combinatorial problems on linear spaces
- **_bootstrap**: Represents system packages required for running the top-level bootstrap script
- **_develop**: Represents system packages recommended for development
- **_recommended**: Represents system packages recommended for additional functionality
- **_sagemath**: Downstream package of Sage in distributions
- **admcycles**: Computation in the tautological ring of the moduli space of curves
- **antic**: Algebraic Number Theory In C
- **auditwheel_or_delocate**: Repair wheels on Linux or macOS
- **benzene**: Generate fusenes and benzenoids with a given number of faces
- **biopython**: Tools for computational molecular biology
- **bliss**: Computing automorphism groups and canonical forms of graphs
- **buckygen**: Efficient generation of nonisomorphic fullerenes
- **cbc**: COIN-OR branch and cut solver for mixed-integer programs
- **ccache**: A compiler cache
- **coxeter3**: Library for Coxeter groups, Bruhat ordering, Kazhdan-Lusztig polynomials
- **cryptominisat**: A SAT solver
- **csdp**: Solver for semidefinite programs
- **cunningham_tables**: List of the prime numbers occurring in the Cunningham table
- **cvxpy**: A domain-specific language for modeling convex optimization problems in Python.
- **cylp**: A Python interface for CLP, CBC, and CGL
- **d3js**: JavaScript library for manipulating documents based on data
- **database_cremona_ellcurve**: Database of elliptic curves
- **database_cubic_hecke**: Ivan Marin’s representations of the cubic Hecke algebra
- **database_jones_numfield**: Table of number fields
- **database_knotinfo**: Content of the KnotInfo and LinkInfo databases as lists of dictionaries
- **database_kohel**: Database of modular and Hilbert polynomials
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- `database_mutation_class`: Database of exceptional mutation classes of quivers
- `database_odlyzko_zeta`: Table of zeros of the Riemann zeta function
- `database_stein_watkins`: Database of elliptic curves (full version)
- `database_stein_watkins_mini`: Database of elliptic curves (small version)
- `database_symbolic_data`: Database from the SymbolicData project
- `debugpy`: An implementation of the Debug Adapter Protocol for Python
- `dot2tex`: Create PGF/TikZ commands from Graphviz output
- `dsdp`: Semidefinite programming solver
- `e_antic`: Real embedded number fields
- `ecos_python`: Embedded Cone Solver (Python wrapper)
- `ffmpeg`: ffmpeg video converter
- `fricas`: A general purpose computer algebra system
- `frobby`: Computations on monomial ideals
- `gap_jupyter`: Jupyter kernel for GAP
- `gap_packages`: A collection of GAP packages
- `git`: Version control system
- `github_cli`: Command-line interface for GitHub
- `gitpython`: GitPython is a python library used to interact with Git repositories
- `glucose`: A SAT solver
- `gp2c`: A compiler for translating GP routines to C
- `graphviz`: Graph visualization software
- `igraph`: A library for creating and manipulating graphs
- `ImageMagick`: A collection of tools and libraries for many image file formats
- `info`: stand-alone Info documentation reader
- `ipympl`: Matplotlib Jupyter Extension
- `isl`: Sets and relations of integer points bounded by affine constraints
- `jupymake`: A Python wrapper for the polymake shell
- `jupyterlab`: An extensible environment for interactive and reproducible computing
- `kenzo`: Construct topological spaces and compute homology groups
- `kissat`: SAT solver
- `latte_int`: Count lattice points, compute volumes, and integrate over convex polytopes
- `libgraphviz`: Graph visualization software (callable library)
- `libnauty`: Find automorphism groups of graphs, generate non-isomorphic graphs (callable library)
- `libogg`: Library for the Ogg multimedia container format
- `libsemigroups`: Library for semigroups and monoids
- `libxml2`: XML parser and toolkit
• lidia: A library for computational number theory
• llvm: The LLVM Compiler Infrastructure, including the Clang C/C++/Objective-C compiler
• lrslib: Reverse search algorithm for vertex enumeration and convex hull problems
• mathics: A general-purpose computer algebra system
• mathics_scanner: Character Tables and Tokenizer for Mathics and the Wolfram Language.
• mcqd: An exact algorithm for finding a maximum clique in an undirected graph
• meataxe: Library for computing with modular representations
• p_group_cohomology: Modular cohomology rings of finite groups
• mpfrcx: Arithmetic of univariate polynomials over arbitrary precision real or complex numbers
• mpsolve: Multivariate polynomial system solver
• nibabel: Access a multitude of neuroimaging data formats
• nodeenv: A tool to create isolated node.js environments
• nodejs: A JavaScript runtime built on Chrome’s V8 JavaScript engine
• normaliz: Computations in affine monoids, vector configurations, lattice polytopes, and rational cones
• notedown: Create IPython notebooks from markdown
• onetbb: oneAPI Threading Building Blocks
• ore_algebra: Ore algebra
• osqp_python: The Operator Splitting QP Solver (Python wrapper)
• p_group_cohomology: Modular cohomology rings of finite groups
• palettable: Color palettes for Python
• pandoc: A document converter
• pandoc_attributes: A parser and generator for pandoc block attributes
• papilo: Parallel presolve for integer and linear optimization
• pari_elldata: PARI data package for elliptic curves
• pari_galpol: PARI data package for polynomials defining Galois extensions of the rationals
• pari_jupyter: A Jupyter kernel for PARI/GP
• pari_nftables: PARI data package for number fields
• pari_seadata: PARI data package needed by ellap for large primes (full version)
• pdf2svg - PDF to SVG convertor
• perl_cpan_polymake_prereq: Represents all Perl packages that are prerequisites for polymake
• perl_mongodb: A prerequisite for polymake’s PolyDB feature
• perl_term_readline-gnu: Perl extension for the GNU Readline/History libraries
• phitigra: A graph editor for SageMath/Jupyter
• pint: Physical quantities module
• plantri: Generate non-isomorphic sphere-embedded graphs
• polymake: Computations with polyhedra, fans, simplicial complexes, matroids, graphs, tropical hypersurfaces
• polytopes_db_4d: Database of 4-dimensional reflexive polytopes
• pybtex: A BibTeX-compatible bibliography processor in Python
• pycosat: SAT solver picosat with Python bindings
• pycryptosat: Python module of cryptominisat
• pyflakes: Passive checker of Python programs
• pygraphviz: Python interface to Graphviz
• pynormaliz: Python bindings for the normaliz library
• pyppeteer: Headless chrome/chromium automation library
• pyscipopt: Python interface and modeling environment for SCIP
• pysingular: A basic Python interface to Singular
• pytest: Simple powerful testing with Python
• pytest_mock: Thin-wrapper around the mock package for easier use with pytest
• pytest_xdist: pytest xdist plugin for distributed testing and loop-on-failing modes
• python_build: A simple, correct PEP517 package builder
• python_igraph: Python bindings for igraph
• pxy: Generate PostScript, PDF, and SVG files in Python
• qdldl_python: QDLDL, a free LDL factorization routine (Python wrapper)
• r: A free software environment for statistical computing and graphics
• retrolab: JupyterLab Distribution with a retro look and feel
• rst2ipynb: Convert reStructuredText files to Jupyter notebooks
• rubiks: Programs for Rubik’s cube
• saclib: Computations with real algebraic numbers
• sage_flatsurf: computation with flat surfaces
• sage_numerical_backends_coin: COIN-OR backend for Sage MixedIntegerLinearProgram
• sage_numerical_backends_cplex: Cplex backend for Sage MixedIntegerLinearProgram
• sage_numerical_backends_gurobi: Gurobi backend for Sage MixedIntegerLinearProgram
• sage_sws2rst: Translate legacy Sage worksheet files (.sws) to reStructuredText (.rst) files
• sagemath_doc_pdf: SageMath documentation in PDF format
• scip: Mixed integer programming solver
• scip_sdp: Mixed integer semidefinite programming plugin for SCIP
• scs: Splitting conic solver
• singular_jupyter: Jupyter kernel for Singular
• sirocco: Compute topologically certified root continuation of bivariate polynomials
• slabbıe: Sébastien Labbé’s Research code
• snappy: Topology and geometry of 3-manifolds, with a focus on hyperbolic structures
• soplex: Linear optimization solver using the revised simplex method

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- sqlalchemy: A database abstraction library
- surface_dynamics: dynamics on surfaces (measured foliations, interval exchange transformation, Teichmüller flow, etc)
- symengine: A C++ symbolic manipulation library
- tdlib: Algorithms for computing tree decompositions
- texlive: A comprehensive TeX system
- texttable: Python module for creating simple ASCII tables
- tides: Integration of ODEs
- topcom: Compute triangulations of point configurations and oriented matroids
CHAPTER THREE

EXPERIMENTAL PACKAGES

Some packages that provide additional functionality are marked as “experimental”. Developers are needed in order to improve the integration of these packages into the Sage distribution.

- awali: Computation of/with finite state machines
- barvinok: Projections of integer point sets of parametric polytopes
- cocoalib: Computations in commutative algebra
- deformation: Count points on hypersurfaces using the deformation method
- gambit: Computations on finite, noncooperative games
- gap3: A minimal distribution of GAP 3 containing packages that have no equivalent in GAP 4
- gdb: The GNU Project debugger
- libtheora: Library for the Theora video codec
- lie: Library for the representation theory of complex semisimple Lie groups and algebras
- modular_decomposition: A modular decomposition algorithm
- polylib: Operations on unions of polyhedra
- qepcad: Quantifier elimination by partial cylindrical algebraic decomposition
- r_jupyter: Jupyter kernel for R
- Sage: Open Source Mathematics Software: Sage categories and basic rings
- Sage: Open Source Mathematics Software: System and software environment
- Sage: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses
- Sage: Open Source Mathematics Software: IPython kernel, Sage preparser, doctest
- surf: Visualization of algebraic curves, algebraic surfaces and hyperplane sections of surfaces
- symengine_py: Python wrappers for SymEngine
- valgrind: Memory error detector, call graph generator, runtime profiler
4.1 Details of external packages

Packages are in alphabetical order.

4.1.1 4ti2: Algebraic, geometric and combinatorial problems on linear spaces

Description

A software package for algebraic, geometric and combinatorial problems on linear spaces. Available at https://4ti2.github.io/.

License

4ti2 is released under a GPL v2 license.

Upstream Contact

- https://4ti2.github.io/
- Raymond Hemmecke, TU Munich, Germany
- Matthias Köppe, UC Davis, CA, USA

Type

optional

Dependencies

- zlib: Data compression library
- $(MP_LIBRARY)
- glpk: GNU Linear Programming Kit
Version Information

package-version.txt:

1.6.7.p0

Equivalent System Packages

arch:

$ sudo pacman -S 4ti2

conda:

$ conda install 4ti2

cygwin:

$ apt-cyg install lib4ti2_0 lib4ti2-devel

Debian/Ubuntu:

$ sudo apt-get install 4ti2

Fedora/Redhat/CentOS:

$ sudo yum install 4ti2

freebsd:

$ sudo pkg install math/4ti2

gentoo:

$ sudo emerge sci-mathematics/4ti2

opensuse:

$ sudo zypper install 4ti2 4ti2-devel

See https://repology.org/project/4ti2/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.2 _bootstrap: Represents system packages required for running the top-level bootstrap script

Description

This optional script package represents the requirements (system packages) that are needed in addition to those represented by the _prereq package in order to run the top-level bootstrap script.
**Type**

optional

**Dependencies**

**Version Information**

**Equivalent System Packages**

**arch:**

```
$ sudo pacman -S autoconf automake libtool pkg-config
```

**conda:**

```
$ conda install autoconf automake libtool
```

**cygwin:**

```
$ apt-cyg install autoconf automake libtool
```

**Debian/Ubuntu:**

```
$ sudo apt-get install autoconf automake libtool pkg-config
```

**Fedora/Redhat/CentOS:**

```
$ sudo yum install autoconf automake libtool pkg-config
```

**freebsd:**

```
$ sudo pkg install autoconf automake libtool pkg-config
```

**gentoo:**

```
$ sudo emerge sys-devel/autoconf sys-devel/automake sys-devel/libtool
```

**homebrew:**

```
$ brew install autoconf automake libtool pkg-config
```

**nix:**

```
$ nix-env --install autoconf automake libtool pkg-config
```

**opensuse:**

```
$ sudo zypper install autoconf automake libtool pkgconfig
```

**slackware:**

```
$ sudo slackpkg install autoconf automake libtool
```

**void:**

```
```

4.1. Details of external packages
$ sudo xbps-install autoconf automake libtool xtools mk-configure

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.3 _develop: Represents system packages recommended for development

Description

Script package representing a list of system packages recommended for developers.

Type

optional

Dependencies

• _bootstrap: Represents system packages required for running the top-level bootstrap script
• git: Version control system
• pytest: Simple powerful testing with Python
• pytest_xdist: pytest xdist plugin for distributed testing and loop-on-failing modes
• github_cli: Command-line interface for GitHub

Version Information

Equivalent System Packages

alpine: install the following packages: gnupg-gpgconf openssh-client
arch:

$ sudo pacman -S gnupg openssh

conda:

$ conda install openssh pycodestyle esbonio

cygwin:

$ apt-cyg install gnupg2

Debian/Ubuntu:

$ sudo apt-get install gpgconf openssh-client

Fedora/Redhat/CentOS:

$ sudo yum install gnupg2 openssh

freebsd:
4.1.4 _prereq: Represents system packages required for installing SageMath from source

**Description**

This dummy package represents the minimal requirements (system packages) for installing SageMath from source.

In addition to standard POSIX utilities and the bash shell, the following standard command-line development tools must be installed on your computer:

- **make**: GNU make, version 3.80 or later. Version 3.82 or later is recommended.
- **m4**: GNU m4 1.4.2 or later (non-GNU or older versions might also work).
- **perl**: version 5.8.0 or later.
- **ar** and **ranlib**: can be obtained as part of GNU binutils.
- **tar**: GNU tar version 1.17 or later, or BSD tar (as provided on macOS).
- **python**: Python 3.4 or later, or Python 2.7. (This range of versions is a minimal requirement for internal purposes of the SageMath build system, which is referred to as sage-bootstrap-python.)

Other versions of these may work, but they are untested.
On macOS, suitable versions of all these tools are provided by the Xcode Command Line Tools. To install them, open a terminal window and run `xcode-select --install`; then click “Install” in the pop-up window. If the Xcode Command Line Tools are already installed, you may want to check if they need to be updated by typing `softwareupdate -l`.

On Linux, `ar` and `ranlib` are in the `binutils` package. The other programs are usually located in packages with their respective names.

On Redhat-derived systems not all perl components are installed by default and you might have to install the `perl-ExtUtils-MakeMaker` package.

To check if you have the above prerequisites installed, for example `perl`, type:

```
$ command -v perl
```

or:

```
$ which perl
```

on the command line. If it gives an error (or returns nothing), then either `perl` is not installed, or it is installed but not in your `PATH`.

**Type**

standard

**Dependencies**

**Version Information**

**Equivalent System Packages**

**arch:**

```
$ sudo pacman -S binutils make m4 perl python tar bc gcc which
```

**conda:**

```
$ conda install compilers make m4 perl python tar bc pkg-config
```

**cygwin:**

```
$ apt-cyg install binutils make m4 python3-urllib3 python3 perl perl-ExtUtils-
MakeMaker tar gcc-core gcc-g++ findutils which libcrypt-devel libiconv-devel
```

**Debian/Ubuntu:**

```
$ sudo apt-get install binutils make m4 perl python3 tar bc gcc g++ ca-certificates
```

**Fedora/Redhat/CentOS:**

```
$ sudo yum install binutils make m4 python3 perl perl-ExtUtils-MakeMaker tar gcc gcc-
c++ findutils which diffutils perl-IPC-Cmd
```

**freebsd:**
$ sudo pkg install gmake automake bash dash python

gentoo:

$ sudo emerge sys-devel/binutils sys-libs/binutils-libs sys-devel/make dev-scheme/guile_
...dev-lib/libffi app-arch/tar sys-devel/gcc dev-lib/mpc sys-libs/glibc sys-kernel/
...linux-headers dev-lang/perl sys-devel/m4 sys-devel/bc dev-lang/python sys-devel/flex,
...app-misc/ca-certificates dev-libs/libxml2 sys-apps/findutils sys-apps/which sys-apps/
...diffutils

homebrew:

nix:

$ nix-env --install binutils gnumake gnum4 perl python3 gnutar bc gcc bash

opensuse:

$ sudo zypper install binutils make m4 perl python3 tar bc which glibc-locale-base gcc_
...gcc-c++ ca-certificates gzip findutils diffutils

slackware:

$ sudo slackpkg install binutils make guile gc libffi "gcc-[0-9]" gcc-11 gcc-g++ gcc-g++-
...11 libmpc glibc kernel-headers perl m4 bc python-2.7 python3 flex ca-certificates pkg-
...config libxml2 cyrus-sasl

void:

$ sudo xbps-install bc binutils gcc libgomp-devel m4 make perl pkg-config python3 tar,
...which

If the system package is installed, ./configure will check whether it can be used.

4.1.5 _recommended: Represents system packages recommended for additional functionality

Description

Script package representing a list of system packages recommended to be installed for additional functionality.

Type

optional
Dependencies

- pandoc: A document converter
- ffmpeg: ffmpeg video converter
- ImageMagick: A collection of tools and libraries for many image file formats
- texlive: A comprehensive TeX system
- git: Version control system

Version Information

Equivalent System Packages

Debian/Ubuntu:

$ sudo apt-get install default-jdk libavdevice-dev

homebrew:

$ brew install texinfo

macports: install the following packages: texinfo

If the system package is installed, ./configure will check whether it can be used.

4.1.6 sagemath: Downstream package of Sage in distributions

SageMath is available from various distributions and can be installed by package managers.

This dummy package records the names of the system packages that should be installed to provide a standard installation of SageMath, including documentation and Jupyter.

Downstream Contact

See Trac wiki page Distribution

Type

optional

Dependencies

Version Information

Equivalent System Packages

arch:

$ sudo pacman -S sagemath sagemath-doc

conda:
$ conda install sage

Debian/Ubuntu:

$sudo apt-get install sagemath sagemath-doc-en sagemath-jupyter

Fedora/Redhat/CentOS:

$sudo yum install sagemath

freebsd:

$sudo pkg install math/sage

homebrew:

$ brew install sage

nix:

$nix-env --install sage

void:

$sudo xbps-install sagemath

See https://repology.org/project/sagemath/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.7 admcycles: Computation in the tautological ring of the moduli space of curves

Description

The SageMath package admcycles offers the possibility to compute in the tautological ring of the Deligne-Mumford compactification of the moduli space of curves. Construction for standard generators are provided (psi, kappa and lambda classes) as well as more advanced algebraic construction (double ramification cycle, strata of differentials).

License

GPLv2+

Upstream Contact

https://pypi.org/project/admcycles/
External Packages, Release 10.0

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

| admcycles |

Equivalent System Packages

(none known)

4.1.8 alabaster: Default theme for the Sphinx documentation system

Description

Alabaster is a visually (c)lean, responsive, configurable theme for the Sphinx documentation system. It is Python 2+3 compatible.

It began as a third-party theme, and is still maintained separately, but as of Sphinx 1.3, Alabaster is an install-time dependency of Sphinx and is selected as the default theme.

Live examples of this theme can be seen on paramiko.org, fabfile.org and pyinvoke.org.

Upstream Contact

https://alabaster.readthedocs.io/en/latest/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
**Version Information**

package-version.txt:

```
0.7.12
```

install-requires.txt:

```
alabaster >=0.7.12
```

**Equivalent System Packages**

conda:

```
$ conda install alabaster
```

opensuse:

```
$ sudo zypper install python3-alabaster
```

void:

```
$ sudo xbps-install python3-alabaster
```

See [https://repology.org/project/alabaster/versions](https://repology.org/project/alabaster/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/wbhart/antic)

### 4.1.9 antic: Algebraic Number Theory In C

**Description**

Algebraic Number Theory In C

**License**

LGPL 2.1

**Upstream Contact**

[https://github.com/wbhart/antic](https://github.com/wbhart/antic)
Type

optional

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- flint: Fast Library for Number Theory

Version Information

package-version.txt:

0.2.5

Equivalent System Packages

arch:

$ sudo pacman -S antic

conda:

$ conda install antic

Debian/Ubuntu:

$ sudo apt-get install libantic-dev

Fedora/Redhat/CentOS:

$ sudo yum install antic-devel

freebsd:

$ sudo pkg install math/antic

opensuse:

$ sudo zypper install antic-devel

See https://repology.org/project/antic/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.10 appdirs: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.

Description

A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.

License

MIT

Upstream Contact

https://pypi.org/project/appdirs/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.4.4

install-requires.txt:

appdirs

Equivalent System Packages

conda:

$ conda install appdirs

void:

$ sudo xbps-install python3-appdirs

If the system package is installed, ./configure will check whether it can be used.
4.1.11 appnope: Disable App Nap on macOS >= 10.9

Description
Disable App Nap on macOS >= 10.9

License
BSD

Upstream Contact
https://pypi.org/project/appnope/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
0.1.3

install-requires.txt:
appnope >=0.1.0

Equivalent System Packages
conda:
$ conda install appnope

macports: install the following packages: py-appnope
See https://repology.org/project/python:appnope/versions
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.12 arb: Arbitrary-precision floating-point ball arithmetic

Description

Arb is a C library for arbitrary-precision floating-point ball arithmetic, developed by Fredrik Johansson (fredrik.johansson@gmail.com). It supports efficient high-precision computation with polynomials, power series, matrices and special functions over the real and complex numbers, with automatic, rigorous error control.

License

GNU General Public License v2+

Upstream Contact

- Fredrik Johansson: fredrik.johansson@gmail.com
- https://arblib.org/
- http://github.com/fredrik-johansson/arb/

Type

standard

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- flint: Fast Library for Number Theory

Version Information

package-version.txt:

```
2.22.1
```

Equivalent System Packages

arch:

```
$ sudo pacman -S arb
```

conda:

```
$ conda install arb
```

Debian/Ubuntu:

```
$ sudo apt-get install libflint-arb-dev
```
Fedora/Redhat/CentOS:

$ sudo yum install arb arb-devel

freebsd:

$ sudo pkg install math/arb

gentoo:

$ sudo emerge sci-mathematics/arb

homebrew:

$ brew install arb

nix:

$ nix-env --install arb

opensuse:

$ sudo zypper install arb-devel

void:

$ sudo xbps-install arb-devel

See https://repology.org/project/arb-fp/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.13 argon2_cffi: The secure Argon2 password hashing algorithm

Description

The secure Argon2 password hashing algorithm.

License

MIT

Upstream Contact

https://pypi.org/project/argon2-cffi/
**Type**

standard

**Dependencies**

- $(PYTHON)
- `argon2_cffi_bindings`: Low-level CFFI bindings for Argon2
- $(PYTHON_TOOLCHAIN)
  - `flit_core`: Distribution-building parts of Flit. See flit package for more information

**Version Information**

package-version.txt:

```
21.3.0
```

install-requires.txt:

```
argon2-cffi
```

**Equivalent System Packages**

conda:

```
$ conda install argon2-cffi
```

macports: install the following packages: py-argon2-cffi

void:

```
$ sudo xbps-install python3-argon2
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.14 argon2_cffi_bindings: Low-level CFFI bindings for Argon2**

**Description**

Low-level CFFI bindings for Argon2
License

MIT

Upstream Contact

https://pypi.org/project/argon2-cffi-bindings/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- cffi: Foreign Function Interface for Python calling C code
- setuptools_scm: Python build system extension to obtain package version from version control

Version Information

package-version.txt:

21.2.0

install-requires.txt:

argon2-cffi-bindings

Equivalent System Packages

(none known)

4.1.15 asttokens: Annotate AST trees with source code positions

Description

Annotate AST trees with source code positions
License

Apache 2.0

Upstream Contact

https://pypi.org/project/asttokens/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.1.0

install-requires.txt:

asttokens

Equivalent System Packages

conda:

$ conda install asttokens

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.16 attrs: Decorator for Python classes with attributes

Description

attrs is the Python package that will bring back the joy of writing classes by relieving you from the drudgery of implementing object protocols (aka dunder methods).
License

MIT License

Upstream Contact

Home page: https://www.attrs.org

Type

standard

Dependencies

- $(PYTHON)
- vcversioner: Python build system extension to obtain package version from version control
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

22.1.0

install-requires.txt:

attrs >=19.3.0

Equivalent System Packages

conda:

$ conda install attrs

macports: install the following packages: py-attrs

void:

$ sudo xbps-install python3-attrs

See https://repology.org/project/python:attrs/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.17 auditwheel_or_delocate: Repair wheels on Linux or macOS

Description

This package represents auditwheel on Linux and delocate on macOS.
(Actually, we install delocate also on Linux because our script make -j list-broken-packages uses a small subroutine of delocate even on Linux.)

License

MIT
BSD 2-clause

Upstream Contact

https://pypi.org/project/auditwheel/
https://pypi.org/project/delocate/

Type

optional

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

delocate
auditwheel; sys_platform != 'darwin'

Equivalent System Packages

(none known)
4.1.18 awali: Computation of/with finite state machines

Description

Awali is a software platform dedicated to the computation of, and with, finite state machines. Here finite state machines is to be understood in the broadest possible sense: finite automata with output — often called transducers then — or even more generally finite automata with multiplicity, that is, automata that not only accept, or recognize, sequences of symbols but compute for every such sequence a ‘value’ that is associated with it and which can be taken in any semiring. Hence the variety of situations that can thus be modelized.

License

- GPL 3.0

Upstream Contact

- Website: http://vaucanson-project.org/Awali/index.html
- Releases: http://files.vaucanson-project.org/tarballs/

Dependencies

- graphviz must be installed from your distro, and available in the path.

Type

experimental

Dependencies

- $(PYTHON)
- cmake: A cross-platform build system generator
- cython: C-Extensions for Python, an optimizing static compiler
- nbconvert: Converting Jupyter Notebooks
- ncurses: Classic terminal output library

Version Information

package-version.txt:

1.0.2-190218
 Equivalent System Packages

See https://repology.org/project/awali/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.19 babel: Internationalization utilities for Python

Description

A collection of tools for internationalizing Python applications.

Upstream Contact

http://babel.pocoo.org/en/latest/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- pytz: Timezone definitions for Python

Version Information

package-version.txt:

2.11.0

install-requires.txt:

babel >=2.6.0

Equivalent System Packages

conda:

$ conda install babel

macports: install the following packages: py-babel

opensuse:

$ sudo zypper install python3-Babel

void:
$ sudo xbps-install python3-Babel

See https://repology.org/project/python:babel/versions
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.20 backcall: Specifications for callback functions

Description
Specifications for callback functions passed in to an API

Type
standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- flit_core: Distribution-building parts of Flit. See flit package for more information
- tomli: A lil’ TOML parser

Version Information

package-version.txt:

0.2.0

install-requires.txt:

backcall >=0.1.0

Equivalent System Packages

conda:

$ conda install backcall

macports: install the following packages: py-backcall

void:

$ sudo xbps-install python3-backcall

See https://repology.org/project/python:backcall/versions
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.21  backports_zoneinfo: Backport of the standard library zoneinfo module

**Description**

Backport of the standard library zoneinfo module for Python 3.8

**License**

Apache-2.0

**Upstream Contact**

https://pypi.org/project/backports.zoneinfo/

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

0.2.1

install-requires.txt:

backports.zoneinfo

**Equivalent System Packages**

conda:

$ conda install backports.zoneinfo

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.22 barvinok: Projections of integer point sets of parametric polytopes

Description

barvinok is a library for counting the number of integer points in parametric and non-parametric polytopes as well as projections of such sets.

License

GPL v2

Upstream Contact

- http://groups.google.com/group/isl-development

Type

experimental

Dependencies

- ntl: A library for doing number theory
- isl: Sets and relations of integer points bounded by affine constraints
- polylib: Operations on unions of polyhedra

Version Information

package-version.txt:

0.41.1

Equivalent System Packages

opensuse:

$ sudo zypper install barvinok "pkgconfig(barvinok)"

See https://repology.org/project/barvinok/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.23 beautifulsoup4: Screen-scraping library

Description

Screen-scraping library

License

MIT

Upstream Contact

https://pypi.org/project/beautifulsoup4/

Type

standard

Dependencies

- $(PYTHON)
- soupsieve: A modern CSS selector implementation for Beautiful Soup.
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

4.11.1

install-requires.txt:

beautifulsoup4

Equivalent System Packages

conda:

$ conda install beautifulsoup4

macports: install the following packages: py-beautifulsoup4

void:

$ sudo xbps-install python3-BeautifulSoup4

See https://repology.org/project/python:beautifulsoup4/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1. Details of external packages
4.1.24 beniget: Extract semantic information about static Python code

Description

Extract semantic information about static Python code

License

BSD 3-Clause

Upstream Contact

https://pypi.org/project/beniget/

Type

standard

Dependencies

- $(PYTHON)
- gast: Python AST that abstracts the underlying Python version
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.4.1

install-requires.txt:

beniget

Equivalent System Packages

conda:

$ conda install beniget

void:

$ sudo xbps-install python3-beniget

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.25 benzene: Generate fusenes and benzenoids with a given number of faces

Description

Benzene is a program for the efficient generation of all nonisomorphic fusenes and benzenoids with a given number of faces. Fusenes are planar polycyclic hydrocarbons with all bounded faces hexagons. Benzenoids are fusenes that are subgraphs of the hexagonal lattice.

License

Benzene is licensed under the GNU General Public License v2 or later (June 2007)

Upstream Contact

Benzene was written by Gunnar Brinkmann and Gilles Caporossi. This version was adapted by Gunnar Brinkmann and Nico Van Cleemput for Grinvin.

http://www.grinvin.org/

Type

optional

Dependencies

Version Information

package-version.txt:

20130630

Equivalent System Packages

arch:

$ sudo pacman -S benzene

opensuse:

$ sudo zypper install benzene

See https://repology.org/project/benzene/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.26 biopython: Tools for computational molecular biology

Description

Freely available tools for computational molecular biology.

License

Upstream Contact

https://pypi.org/project/biopython/
http://biopython.org/

Type

optional

Dependencies

Version Information

requirements.txt:

biopython

Equivalent System Packages

conda:

$ conda install biopython

macports: install the following packages: py-biopython


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.27 bleach: An HTML-sanitizing tool

Description

An easy safelist-based HTML-sanitizing tool.
License

Apache License v2

Upstream Contact

Home Page: https://github.com/mozilla/bleach

Type

standard

Dependencies

- $(PYTHON)
- packaging: Core utilities for Python packages
- six: Python 2 and 3 compatibility utilities
- webencodings: Character encoding aliases for legacy web content
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

5.0.1

install-requires.txt:

bleach >=3.1.5

Equivalent System Packages

conda:

$ conda install bleach

macports: install the following packages: py-bleach

void:

$ sudo xbps-install python3-bleach

See https://repology.org/project/python:bleach/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.28 bliss: Computing automorphism groups and canonical forms of graphs

Description

bliss is an open source tool for computing automorphism groups and canonical forms of graphs.

License

LGPL

Upstream Contact

Bliss is currently being maintained by Tommi Junttila and Petteri Kaski.

http://www.tcs.tkk.fi/Software/bliss/index.html

We apply patches generated from https://github.com/mkoeppe/bliss (branch apply_debian_patches) as our upstream. This tracks the patches from the Debian package, adding an autotools build system and adjusting the include file locations.

Type

optional

Dependencies

Version Information

package-version.txt:

| 0.73+debian-1+sage-2016-08-02.p0 |

Equivalent System Packages

arch:

$ sudo pacman -S bliss

conda:

$ conda install bliss

opensuse:

$ sudo zypper install bliss bliss-devel

See https://repology.org/project/bliss-graphs/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.29 boost_cropped: Portable C++ libraries (subset needed for Sage)

Description

Boost provides free peer-reviewed portable C++ source libraries.

We emphasize libraries that work well with the C++ Standard Library. Boost libraries are intended to be widely useful, and usable across a broad spectrum of applications. The Boost license encourages both commercial and non-commercial use.

We aim to establish “existing practice” and provide reference implementations so that Boost libraries are suitable for eventual standardization. Ten Boost libraries are already included in the C++ Standards Committee’s Library Technical Report (TR1) and will be in the new C++0x Standard now being finalized. C++0x will also include several more Boost libraries in addition to those from TR1. More Boost libraries are proposed for TR2.

License

Boost Software License - see http://www.boost.org/users/license.html

Upstream Contact

Website: http://www.boost.org/
See mailing list page at http://www.boost.org/community/groups.html

Type

standard

Dependencies

Version Information

package-version.txt:

1.66.0.p0

Equivalent System Packages

arch:

$ sudo pacman -S boost

conda:

$ conda install boost-cpp

cygwin:

$ apt-cyg install libboost-devel

Debian/Ubuntu:
$ sudo apt-get install libboost-dev

Fedora/Redhat/CentOS:

$ sudo yum install boost-devel

freebsd:

$ sudo pkg install devel/boost-libs

homebrew:

$ brew install boost

macports: install the following packages: boost

nix:

$ nix-env --install boost

opensuse:

$ sudo zypper install boost-devel

slackware:

$ sudo slackpkg install boost

void:

$ sudo xbps-install boost-devel

See [https://repology.org/project/boost/versions](https://repology.org/project/boost/versions)

If the system package is installed, ./configure will check whether it can be used.

### 4.1.30 brial: Boolean Ring Algebra implementation using binary decision diagrams

**Description**

BRiAl (“Boolean Ring Algebra”) is the successor to PolyBoRi.

The core of PolyBoRi is a C++ library, which provides high-level data types for Boolean polynomials and monomials, exponent vectors, as well as for the underlying polynomial rings and subsets of the powerset of the Boolean variables. As a unique approach, binary decision diagrams are used as internal storage type for polynomial structures. On top of this C++–library we provide a Python interface. This allows parsing of complex polynomial systems, as well as sophisticated and extendable strategies for Gröbner base computation. PolyBoRi features a powerful reference implementation for Gröbner basis computation.
License

GPL version 2 or later

Upstream Contact

https://github.com/BRiAl/BRiAl

Type

standard

Dependencies

- `boost_cropped`: Portable C++ libraries (subset needed for Sage)
- `m4ri`: fast arithmetic with dense matrices over GF(2)
- `libpng`: Bitmap image support
- `pkgconf`: An implementation of the pkg-config spec

Version Information

package-version.txt:

```
1.2.8
```

Equivalent System Packages

arch:

```
$ sudo pacman -S brial
```

conda:

```
$ conda install brial
```

Debian/Ubuntu:

```
$ sudo apt-get install libbrial-dev libbrial-groebner-dev
```

Fedora/Redhat/CentOS:

```
$ sudo yum install brial brial-devel
```

freebsd:

```
$ sudo pkg install math/brial
```

gentoo:

```
```

4.1. Details of external packages
$ sudo emerge sci-libs/brial

nix:
$ nix-env --install brial

opensuse:
$ sudo zypper install brial-devel

void:
$ sudo xbps-install brial-devel

See https://repology.org/project/brial/versions
If the system package is installed, ./configure will check whether it can be used.

### 4.1.31 buckygen: Efficient generation of nonisomorphic fullerenes

#### Description

Buckygen is a program for the efficient generation of all nonisomorphic fullerenes. These are triangulations where all vertices have degree 5 or 6. Or if the dual representation is used: cubic plane graphs where all faces are pentagons or hexagons.

#### License

Buckygen is licensed under the GNU General Public License v3 (June 2007)

#### Upstream Contact

Buckygen was mainly written by Jan Goedgebeur, jan.goedgebeur[at]ugent.be.

http://caagt.ugent.be/buckygen/

#### Type

optional

#### Dependencies

#### Version Information

package-version.txt:

1.1
Equivalent System Packages

arch:

```bash
$ sudo pacman -S buckygen
```

opensuse:

```bash
$ sudo zypper install buckygen
```

See https://repology.org/project/buckygen/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.32 bzip2: High-quality data compressor

Description

bzip2 is a freely available, patent free, high-quality data compressor.

It typically compresses files to within 10% to 15% of the best available techniques (the PPM family of statistical compressors), whilst being around twice as fast at compression and six times faster at decompression.

License

BSD-style

Upstream Contact

- Website http://bzip.org/
- Author: Julian Seward <julian@bzip.org>

Special Update/Build Instructions

This package must not be bzip2 compressed, so create it using

```bash
tar c bzip2-1.0.6 | gzip --best >bzip2-1.0.6.spkg
```

The build system has been autotoolized based on a patch by the Suse folk at http://ftp.uni-kl.de/pub/linux/suse/people/sbrabec/bzip2/for_downstream/bzip2-1.0.6-autoconfiscated.patch

See patches/autotools and spkg-src for details.
External Packages, Release 10.0

Type
standard

Dependencies

- pkgconf: An implementation of the pkg-config spec

Version Information

package-version.txt:

1.0.6-20150304.p0

Equivalent System Packages

conda:

$ conda install bzip2

cygwin:

$ apt-cyg install bzip2 libbz2-devel

Debian/Ubuntu:

$ sudo apt-get install libbz2-dev bzip2

Fedora/Redhat/CentOS:

$ sudo yum install bzip2 bzip2-devel

homebrew:

$ brew install bzip2

opensuse:

$ sudo zypper install bzip2 "pkgconfig(bzip2)"

slackware:

$ sudo slackpkg install bzip2

void:

$ sudo xbps-install bzip2-devel

See https://repology.org/project/bzip2/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.33 cbc: COIN-OR branch and cut solver for mixed-integer programs

Description

The Computational Infrastructure for Operations Research (COIN-OR**, or simply COIN) project is an initiative to spur the development of open-source software for the operations research community.

The COIN Branch and Cut solver (CBC) is an open-source mixed-integer program (MIP) solver written in C++. CBC is intended to be used primarily as a callable library to create customized branch-and-cut solvers. A basic, stand-alone executable version is also available.

License

Eclipse Public License, Version 1.0 (EPL-1.0) (http://opensource.org/licenses/eclipse-1.0)

Upstream Contact

- https://github.com/coin-or/Cbc

Type

optional

Dependencies

- readline: Command line editing library
- zlib: Data compression library
- bzip2: High-quality data compressor
- $(BLAS)

Version Information

package-version.txt:

2.9.4.p0

Equivalent System Packages

arch:

$ sudo pacman -S coin-or-cbc

conda:

$ conda install coincbc

Debian/Ubuntu:
$ sudo apt-get install coinor-cbc coinor-libcbc-dev

Fedora/Redhat/CentOS:

$ sudo yum install coin-or-Cbc coin-or-Cbc-devel

freebsd:

$ sudo pkg install math/cbc

gentoo:

$ sudo emerge sci-libs/coinor-cbc

homebrew:

$ brew install cbc

nix:

$ nix-env --install cbc

void:

$ sudo xbps-install CoinMP-devel

See https://repology.org/project/coin-or-cbc/versions, https://repology.org/project/cbc/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.34 ccache: A compiler cache

Description

ccache is a compiler cache. It speeds up recompilation by caching previous compilations and detecting when the same compilation is being done again. Supported languages are C, C++, Objective-C and Objective-C++.

License

GNU General Public License version 3 or later

Upstream Contact

- Author: Andrew Tridgell
- Website: http://ccache.samba.org/
Type
optional

Dependencies

• zlib: Data compression library

Version Information

package-version.txt:
3.3.4

Equivalent System Packages

conda:
$ conda install ccache

homebrew:
$ brew install ccache

macports: install the following packages: ccache

opensuse:
$ sudo zypper install ccache

void:
$ sudo xbps-install ccache

See https://repology.org/project/ccache/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.35 cddlib: Double description method for polyhedral representation conversion

Description

The C-library cddlib is a C implementation of the Double Description Method of Motzkin et al. for generating all vertices (i.e. extreme points) and extreme rays of a general convex polyhedron in \( \mathbb{R}^d \) given by a system of linear inequalities:

\[
P = \{ \ x=(x_1, \ldots, x_d)^T : b - A x >= 0 \} \]

where \( A \) is a given \( m \times d \) real matrix, \( b \) is a given \( m \)-vector and 0 is the \( m \)-vector of all zeros.

The program can be used for the reverse operation (i.e. convex hull computation). This means that one can move back and forth between an inequality representation and a generator (i.e. vertex and ray) representation of a polyhedron
with cdd. Also, cdd can solve a linear programming problem, i.e. a problem of maximizing and minimizing a linear function over P.

**License**

GPL v2

**Upstream Contact**

https://github.com/cddlib/cddlib

**Type**

standard

**Dependencies**

- $(MP_LIBRARY)

**Version Information**

package-version.txt:

| 0.94m |

**Equivalent System Packages**

arch:

$ sudo pacman -S cddlib

conda:

$ conda install cddlib

cygwin:

$ apt-cyg install cddlib-devel cddlib-tools

Debian/Ubuntu:

$ sudo apt-get install libcdd-dev libcdd-tools

Fedora/Redhat/CentOS:

$ sudo yum install cddlib

freebsd:
$ sudo pkg install math/cddlib

gentoo:
$ sudo emerge sci-libs/cddlib

homebrew:
$ brew install cddlib

macports: install the following packages: cddlib
nix:
$ nix-env --install cddlib

opensuse:
$ sudo zypper install cddlib-tools "pkgconfig(cddlib)"

void:
$ sudo xbps-install cddlib-devel

See https://repology.org/project/cddlib/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.36 certifi: Python package for providing Mozilla’s CA Bundle

Description
Python package for providing Mozilla's CA Bundle.

License
ISC

Upstream Contact
Home page: https://pypi.python.org/pypi/certifi

Type
standard
External Packages, Release 10.0

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.9.24

install-requires.txt:

certifi >=2020.6.20

Equivalent System Packages

conda:

$ conda install certifi

macports: install the following packages: py-certifi
opensuse:

$ sudo zypper install python3-certifi
void:

$ sudo xbps-install python3-certifi

See [https://repology.org/project/python:certifi/versions](https://repology.org/project/python:certifi/versions)
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

4.1.37 cffi: Foreign Function Interface for Python calling C code

Description

development website: [https://foss.heptapod.net/pypy/cffi](https://foss.heptapod.net/pypy/cffi)
PyPI page: [https://pypi.org/project/cffi/](https://pypi.org/project/cffi/)
License

MIT

Upstream Contact

https://foss.heptapod.net/pypy/cffi

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- pycparser: Parser of the C language in Python

Version Information

package-version.txt:

1.15.1

install-requires.txt:

cffi >=1.14.0

Equivalent System Packages

conda:

$ conda install cffi

macports: install the following packages: py-cffi

opensuse:

$ sudo zypper install python3-cffi

void:

$ sudo xbps-install python3-cffi

See https://repology.org/project/python:cffi/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1. Details of external packages
4.1.38 charset_normalizer: The Real First Universal Charset Detector. Open, modern and actively maintained alternative to Chardet.

Description

The Real First Universal Charset Detector. Open, modern and actively maintained alternative to Chardet.

License

MIT

Upstream Contact

https://pypi.org/project/charset-normalizer/

Type

standard

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.1.1

install-requires.txt:

charset-normalizer

Equivalent System Packages

conda:

$ conda install charset-normalizer

void:

$ sudo xbps-install python3-charset-normalizer

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.39 cliquer: Routines for clique searching

Description

Cliquer is a set of C routines for finding cliques in an arbitrary weighted graph. It uses an exact branch-and-bound algorithm developed by Patric Östergård.

License

GNU General Public License v2

Upstream Contact

Cliquer was mainly written by Sampo Niskanen, sampo.niskanen@iki.fi (Q=®).
https://users.aalto.fi/~pat/cliquer.html

Patches

• minor config updates (v1.22)
• autotoolized - see https://github.com/dimpase/autocliquer (v1.21)

Type

standard

Dependencies

Version Information

package-version.txt:

1.22

Equivalent System Packages

conda:

$ conda install cliquer

Debian/Ubuntu:

$ sudo apt-get install cliquer libcliquer-dev

Fedora/Redhat/CentOS:

$ sudo yum install cliquer cliquer-devel

freebsd:
$ sudo pkg install math/cliquer

gentoo:
$ sudo emerge sci-mathematics/cliquer

nix:
$ nix-env --install cliquer

opensuse:
$ sudo zypper install cliquer cliquer-devel

void:
$ sudo xbps-install cliquer-devel

See https://repology.org/project/cliquer/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.40 cmake: A cross-platform build system generator

Description
The “cmake” executable is the CMake command-line interface. It may be used to configure projects in scripts. Project configuration settings may be specified on the command line with the -D option. The -I option will cause cmake to interactively prompt for such settings.

CMake is a cross-platform build system generator. Projects specify their build process with platform-independent CMake listfiles included in each directory of a source tree with the name CMakeLists.txt. Users build a project by using CMake to generate a build system for a native tool on their platform.

License
CMake is distributed under the OSI-approved BSD 3-clause License.

Upstream Contact
- https://cmake.org/
- cmake-developers@cmake.org
Type
standard

Dependencies

- curl: Multiprotocol data transfer library and utility
- zlib: Data compression library
- bzip2: High-quality data compressor
- liblzma: General-purpose data compression software

Version Information

package-version.txt:
3.24.3

Equivalent System Packages

alpine: install the following packages: cmake
arch:
$ sudo pacman -S cmake
conda:
$ conda install cmake
cygwin:
$ apt-cyg install cmake
Debian/Ubuntu:
$ sudo apt-get install cmake
Fedora/Redhat/CentOS:
$ sudo yum install cmake
freebsd:
$ sudo pkg install devel/cmake
gentoo:
$ sudo emerge dev-util/cmake
homebrew:
$ brew install cmake

macports: install the following packages: cmake

nix:

$ nix-env --install cmake

opensuse:

$ sudo zypper install cmake

slackware:

$ sudo slackpkg install cmake

void:

$ sudo xbps-install cmake

See [https://repology.org/project/cmake/versions](https://repology.org/project/cmake/versions)

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.41 cocoalib: Computations in commutative algebra

**Description**

CoCoA is a program to compute with numbers and polynomials.

**License**

- GPL v3

**Upstream Contact**

- Authors: [http://cocoa.dima.unige.it/research/](http://cocoa.dima.unige.it/research/)
- Email: cocoa@dima.unige.it
- Website: [http://cocoa.dima.unige.it/](http://cocoa.dima.unige.it/)
- Releases: [http://cocoa.dima.unige.it/cocoalib/](http://cocoa.dima.unige.it/cocoalib/)

**Type**

experimental
Dependencies

- $(MP_LIBRARY)

Version Information

package-version.txt:

0.99564

Equivalent System Packages
deprecated:

freebsd:

$ sudo pkg install math/cocoa/

See https://repology.org/project/cocoalib/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.42 combinatorial_designs: Data from the Handbook of Combinatorial Designs

Description

Data for Combinatorial Designs. Current content:

- The table of MOLS (10 000 integers) from the Handbook of Combinatorial Designs, 2ed.

License

Public domain.

Upstream Contact

None

Type

standard
Dependencies

Version Information

package-version.txt:

20140630.p0

Equivalent System Packages

arch:

$ sudo pacman -S sage-data-combinatorial_designs

conda:

$ conda install sagemath-db-combinatorial-designs

See https://repology.org/project/sagemath-combinatorial-designs/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.43 configure: Files of the Sage distribution that are autogenerated in the bootstrapping phase

Description

This package contains a tar archive of auto-generated files. They are shipped with Sage in case you do not have a sufficiently recent autotools version installed.

License

GPLv3+

Upstream Contact

Automatically generated by Sage, use trac and/or sage-devel for questions.

Special Update/Build Instructions

This tarball is automatically generated by Sage whenever you run the $SAGE_ROOT/bootstrap -s or the $SAGE_ROOT/src/bin/sage-update-version script.
Type

base

Dependencies

Version Information

package-version.txt:

8476c4695880ff35d9e534e916d2841a67cba0de

Equivalent System Packages

(none known)

4.1.44 contourpy: Python library for calculating contours of 2D quadrilateral grids

Description

Python library for calculating contours of 2D quadrilateral grids

License

BSD-3-Clause

Upstream Contact

https://pypi.org/project/contourpy/

Type

standard

Dependencies

- $(PYTHON)
- numpy: Package for scientific computing with Python
- $(PYTHON_TOOLCHAIN)
- pybind11: Create Python bindings to C++ code
Version Information

package-version.txt:

1.0.6

install-requires.txt:

contourpy

Equivalent System Packages

(none known)

4.1.45 conway_polynomials: Tables of Conway polynomials over finite fields

Description

Frank Lübeck’s tables of Conway polynomials over finite fields.

Upstream contact

http://www.math.rwth-aachen.de/~Frank.Luebeck/data/ConwayPol/

Type

standard

Dependencies

• $(PYTHON)

Version Information

package-version.txt:

0.5

Equivalent System Packages

arch:

$ sudo pacman -S sage-data-conway_polynomials

conda:

$ conda install sagemath-db-conway-polynomials
See https://repology.org/project/sagemath-conway-polynomials/versions

However, these system packages will not be used for building Sage because `spkg-configure.m4` has not been written for this package; see github issue #27330

### 4.1.46 coxeter3: Library for Coxeter groups, Bruhat ordering, Kazhdan-Lusztig polynomials

#### Description

This package wraps Fokko Ducloux’s Coxeter 3 C++ library

Features:
- General Coxeter groups, implemented through the combinatorics of reduced words;
- Reduced expression and normal form computations;
- Bruhat ordering;
- Ordinary Kazhdan-Lusztig polynomials;
- Kazhdan-Lusztig polynomials with unequal parameters;
- Inverse Kazhdan-Lusztig polynomials;
- Cells and W-graphs;

http://math.univ-lyon1.fr/~ducloux/coxeter/coxeter3/english/coxeter3_e.html

This is a patched version done by Mike Hansen 2009-2013 and some fixes by Nicolas M. Thiéry and Jean-Pierre Flori.

#### License

GPL

#### Upstream Contact

github: https://github.com/tscrim/coxeter

Alas, Fokko Ducloux passed away in 2006.

http://math.univ-lyon1.fr/~ducloux/du_Cloux.html

#### Special Update/Build Instructions

The source package was created by running

```bash
commit=8ac9c71723c8ca57a836d6381aed125261e44e9e
git clone https://github.com/tscrim/coxeter.git
cd coxeter
git archive $commit | bzip2 --best >coxeter-$commit.tar.bz2
```
Type

optional

Dependencies

Version Information

package-version.txt:

8ac9c71723c8ca57a836d6381aed125261e44e9e.p0

Equivalent System Packages

arch:

$ sudo pacman -S coxeter

Fedora/Redhat/CentOS:

$ sudo yum install coxeter coxeter-devel coxeter-tools

opensuse:

$ sudo zypper install coxeter

See https://repology.org/project/coxeter/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.47  cppy: C++ headers for C extension development

Description

From: https://pypi.org/project/cppy/

A small C++ header library which makes it easier to write Python extension modules. The primary feature is a PyObject smart pointer which automatically handles reference counting and provides convenience methods for performing common object operations.

License

Modified BSD 3-Clause-License
**Upstream Contact**

https://github.com/nucleic/cppy

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
1.2.1
```

install-requires.txt:

```
cppy
```

**Equivalent System Packages**

conda:

```
$ conda install cppy
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.48 cryptominisat: A SAT solver**

**Description**

CryptoMiniSat is a SAT solver that aims to become a premiere SAT solver with all the features and speed of successful SAT solvers, such as MiniSat and PrecoSat. The long-term goals of CryptoMiniSat are to be an efficient sequential, parallel and distributed solver. There are solvers that are good at one or the other, e.g. ManySat (parallel) or PSolver (distributed), but we wish to excel at all.

CryptoMiniSat 2.5 won the SAT Race 2010 among 20 solvers submitted by researchers and industry.
License

MIT License

Upstream Contact

- Authors: Mate Soos
- Email: soos.mate@gmail.com
- Website: http://www.msoos.org/
- Releases: https://github.com/msoos/cryptominisat/releases

Special Update/Build Instructions

CryptoMiniSat’s tarball downloaded from github is called VERSION.tar.gz and should be renamed to cryptominisat-VERSION.tar.gz. Its Python module is installed by the pycryptosat spkg.

Type

optional

Dependencies

- $(PYTHON)
- m4ri: fast arithmetic with dense matrices over GF(2)
- zlib: Data compression library
- libpng: Bitmap image support
- cmake: A cross-platform build system generator
- boost_cropped: Portable C++ libraries (subset needed for Sage)

Version Information

package-version.txt:

5.8.0

Equivalent System Packages

conda:

$ conda install cryptominisat

homebrew:

$ brew install cryptominisat
See https://repology.org/project/cryptominisat/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.49 csdp: Solver for semidefinite programs

Description

This is a fast SDP solver written in C, with a callable library namely, an autotool’ed version of CSDP, by Brian Borchers, see https://projects.coin-or.org/Csdp

License

Common Public License Version 1.0

Upstream Contact

Dmitrii Pasechnik <dimpase+sage@gmail.com>

Special Update/Build Instructions

csdp is an autotool’ed version of CSDP, see https://projects.coin-or.org/Csdp, developed in its own repository at https://github.com/dimpase/csdp.

To update to a new version, you need to bump the version number in configure.ac and rerun autotools (autoreconf -fiv). Any changes should be merged to the upstream repo.

The build is done with NOSHORTS variable defined; this makes it compatible with packages, where NOSHORTS must be defined, e.g. https://github.com/dimpase/pycsdp; also the Sage Cython interface needs NOSHORTS defined.

Detailed steps to build the spkg are as follows. You need

- git
- autotools and libtool (the full autohell suite, version at least 2.67)

With these ready:

- ./spkg-src
  - copy the resulting csdp-<version>.tar.gz to SAGE_ROOT/upstream, or somewhere else appropriate

Type

optional
Dependencies

- $(BLAS)

Version Information

package-version.txt:

6.2.p1

Equivalent System Packages

arch:

$ sudo pacman -S coin-or-csdp

See https://repology.org/project/coin-or-csdp/versions, https://repology.org/project/csdp/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.50 cunningham_tables: List of the prime numbers occuring in the Cunningham table

The script read_cunningham_prime_factors.py was used to generate the data set from the file http://cage.ugent.be/~jdemeyer/cunningham/main.gz We include a local copy, main.gz (see comments in the file for details)

Type

optional

Dependencies

Version Information

package-version.txt:

1.0

Equivalent System Packages

See https://repology.org/project/cunningham-tables/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.51 curl: Multiprotocol data transfer library and utility

Description

Multiprotocols data transfer library (and utility).

License

“MIT style license” : see file “COPYING” at the root of the source tarball, explanations at https://curl.haxx.se/docs/copyright.html.

Upstream Contact

According to the file README at the root of the tarball, contact is done by mailing https://curl.haxx.se/mail/

Type

standard

Dependencies

• openssl: Implementation of the SSL and TLS protocols

Version Information

package-version.txt:

7.84.0

Equivalent System Packages

conda:

$ conda install curl

cygwin:

$ apt-cyg install libcurl-devel curl

Debian/Ubuntu:

$ sudo apt-get install curl libcurl4-openssl-dev

Fedora/Redhat/CentOS:

$ sudo yum install libcurl-devel curl

freebsd:
$ sudo pkg install ftp/curl

homebrew:

$ brew install curl

macports: install the following packages: curl

opensuse:

$ sudo zypper install curl "pkgconfig(libcurl)"

slackware:

$ sudo slackpkg install curl cyrus-sasl openldap-client libssh2

void:

$ sudo xbps-install curl libcurl-devel

See [https://repology.org/project/curl/versions](https://repology.org/project/curl/versions)

If the system package is installed, ./configure will check whether it can be used.

### 4.1.52 cvxopt: Python software for convex optimization

**Description**

CVXOPT is a free software package for convex optimization based on the Python programming language. It can be used with the interactive Python interpreter, on the command line by executing Python scripts, or integrated in other software via Python extension modules. Its main purpose is to make the development of software for convex optimization applications straightforward by building on Python’s extensive standard library and on the strengths of Python as a high-level programming language.

**Upstream Contact**

- J. Dahl <dahl.joachim@gmail.com>
- L. Vandenberghe <vandenbe@ee.ucla.edu>

[https://cvxopt.org/](https://cvxopt.org/)

**License**

GPLv3 or later. Includes parts under GPLv2, GNU Lesser General Public License, v2.1. See src/LICENSE for more details. (Sage-compatible)
Type

standard

Dependencies

- $\text{(PYTHON)}$
- *numpy*: Package for scientific computing with Python
- $\text{(BLAS)}$
- *gsl*: The GNU Scientific Library
- *glpk*: GNU Linear Programming Kit
- *suitesparse*: A suite of sparse matrix software
- $\text{(PYTHON\_TOOLCHAIN)}$
- *pkgconfig*: Python interface to pkg-config

Version Information

package-version.txt:

```
1.3.0
```

install-requires.txt:

```
cvxopt >=1.2.5
```

Equivalent System Packages

conda:

```
$ conda install cvxopt
```

freebsd:

```
$ sudo pkg install math/py-cvxopt
```

macports: install the following packages: py-cvxopt

See https://repology.org/project/python:cvxopt/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.53 cvxpy: A domain-specific language for modeling convex optimization problems in Python.

Description
A domain-specific language for modeling convex optimization problems in Python.

License
Apache License, Version 2.0

Upstream Contact
https://pypi.org/project/cvxpy/

Type
optional

Dependencies
- $\text{(PYTHON)}$
- numpy: Package for scientific computing with Python
- scipy: Scientific tools for Python
- glpk: GNU Linear Programming Kit
- cvxopt: Python software for convex optimization
- osqp_python: The Operator Splitting QP Solver (Python wrapper)
- ecos_python: Embedded Cone Solver (Python wrapper)
- scs: Splitting conic solver
- $\text{(PYTHON\_TOOLCHAIN)}$

Version Information
package-version.txt:
1.3.0

install-requires.txt:
cvxpy
Equivalent System Packages

conda:

```bash
$ conda install cvxpy
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.54 cycler: Composable cycles

Description

Cycler is a small break-off of matplotlib to deal with “composable cycles”. It is a required dependency of matplotlib 1.5.0.

License

BSD

Upstream Contact

cycler is developed on github: https://github.com/matplotlib/cycler

A more informative webpage about cycler, its motivation and usage is at http://tacaswell.github.io/cycler/

Type

standard

Dependencies

- $(PYTHON)
- six: Python 2 and 3 compatibility utilities
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
0.11.0
```

install-requires.txt:

```
cycler >=0.10.0
```
Equivalent System Packages

conda:

```
$ conda install cycler
```

macports: install the following packages: py-cycler

```
$ sudo xbps-install python3-cycler
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.55 cylp: A Python interface for CLP, CBC, and CGL

Description

A Python interface for CLP, CBC, and CGL

License

Eclipse Public License (EPL) version 2 (without a Secondary Licenses Notice).

Note: This license is incompatible with the GPL according to https://www.gnu.org/licenses/license-list.html#EPL2; see also the discussion in github issue #26511.

Upstream Contact

https://pypi.org/project/cylp/

Type

optional

Dependencies

- $(PYTHON)
- numpy: Package for scientific computing with Python
- scipy: Scientific tools for Python
- cbc: COIN-OR branch and cut solver for mixed-integer programs
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
Version Information

package-version.txt:

0.91.5

install-requires.txt:

cylp

Equivalent System Packages

(none known)

4.1.56 cypari2: Python interface to the number theory library libpari

Description

A Python interface to the number theory library libpari.

License

GPL version 2 or later

Upstream Contact

https://github.com/defeo/cypari2

Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- pari: Computer algebra system for fast computations in number theory
- cysignals: Interrupt and signal handling for Cython
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

2.1.3

install-requires.txt:

cypari2 >=2.1.1

Equivalent System Packages

conda:

$ conda install cypari2

See https://repology.org/project/python:cypari2/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.57 cysignals: Interrupt and signal handling for Cython

Description

Interrupt and signal handling for Cython

License

LGPL version 3 or later

Upstream Contact

https://github.com/sagemath/cysignals

Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- pari: Computer algebra system for fast computations in number theory
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

1.11.2

install-requires.txt:

cysignals >=1.10.2

Equivalent System Packages

conda:

$ conda install cysignals

See https://repology.org/project/cysignals/versions, https://repology.org/project/python:cysignals/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.58 cython: C-Extensions for Python, an optimizing static compiler

Description

Cython is a language that makes writing C extensions for the Python language as easy as Python itself. Cython is based on the well-known Pyrex, but supports more cutting edge functionality and optimizations.

The Cython language is very close to the Python language, but Cython additionally supports calling C functions and declaring C types on variables and class attributes. This allows the compiler to generate very efficient C code from Cython code.

This makes Cython the ideal language for wrapping for external C libraries, and for fast C modules that speed up the execution of Python code.

License

Apache License, Version 2.0

Upstream Contact

- http://www.cython.org/
- cython-devel@python.org
External Packages, Release 10.0

Type

standard

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.29.32.p2

install-requires.txt:

cython >=0.29.21, <1.0

Equivalent System Packages

conda:

$ conda install cython

freebsd:

$ sudo pkg install lang/cython

homemrew:

$ brew install cython

macports: install the following packages: py-cython

void:

$ sudo xbps-install python3-Cython

See https://repology.org/project/python:cython/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.59 d3.js: JavaScript library for manipulating documents based on data

Description
D3.js is a JavaScript library for manipulating documents based on data. The file d3.min.js will be placed into the ${SAGE_SHARE}/d3js/ directory.

License
BSD 3-Clause License

Upstream Contact
- Author: Mike Bostock (http://bost.ocks.org/mike/)
- Home page: http://d3js.org/

Special Update/Build Instructions
Two kind of archives can be downloaded from d3.js website: one with all source code and tests that weights 2,9M (both in zip and tar.gz formats) and one with the final javascript scripts which weights 121K (zip format only). Since testing requires node.js that is not shipped with Sage, we currently ship the final js only. Hence we have to transform it from zip to tar.gz format. Running sage-src should do all the repackaging job.

Type
optional

Dependencies

Version Information
package-version.txt:

3.4.8

Equivalent System Packages
See https://repology.org/project/node:d3/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.60 database_cremona_ellcurve: Database of elliptic curves

Description

John Cremona’s database of elliptic curves
See https://github.com/JohnCremona/ecdata
This is an optional package, not included by default.

License

Public Domain

Upstream Contact

- Author: John Cremona
- Email: john.cremona@gmail.com
- Website: http://homepages.warwick.ac.uk/staff/J.E.Cremona/

Update Instructions

Get an up-to-date copy of the git repository ecdata from https://github.com/JohnCremona/ecdata.
If the cremona database has already been installed, remove SAGE_DATA/cremona/cremona.db. Then run
The build script expects to find the files in subfolders allcurves, allgens, degphi and allbsd of the ecdata folder. It
extracts them and builds the new cremona.db file from the contents.
Finally, copy SAGE_DATA/cremona/cremona.db to the src directory of the spkg.

Type

optional

Dependencies

Version Information

package-version.txt:

20190911
Equivalent System Packages


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.61 database_cubic_hecke: Ivan Marin’s representations of the cubic Hecke algebra

Description

Ivan Marin’s representations of the cubic Hecke algebra on 4 strands as Python dictionaries

License

GPL

Upstream Contact

https://pypi.org/project/database-cubic-hecke/

Type

optional

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.3.1

install-requires.txt:

database-cubic-hecke
Equivalent System Packages

(none known)

4.1.62 database_jones_numfield: Table of number fields

Description

This is a table of number fields with bounded ramification and degree at most 6.

License

GPLv2+

Upstream Contact

sage-devel@googlegroups.com

Special Update/Build Instructions

Created by taking the original old-style spkg and removing crud from it.

Type

optional

Dependencies

Version Information

package-version.txt:

4

Equivalent System Packages

See https://repology.org/project/sage-data-jones-numfield/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.63 database_knotinfo: Content of the KnotInfo and LinkInfo databases as lists of dictionaries

Description

Content of the KnotInfo and LinkInfo databases as lists of dictionaries

License

GPL

Upstream Contact

https://pypi.org/project/database-knotinfo/

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.7.1

install-requires.txt:

database-knotinfo

Equivalent System Packages

(none known)

4.1.64 database_kohel: Database of modular and Hilbert polynomials

Description

Database of modular and Hilbert polynomials.
External Packages, Release 10.0

Upstream Contact

• David Kohel <David.Kohel@univ-amu.fr>

Type

optional

Dependencies

Version Information

package-version.txt:

20160724

Equivalent System Packages

See https://repology.org/project/sage-data-kohel/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.65 database_mutation_class: Database of exceptional mutation classes of quivers

Description

Contains a database of all exceptional mutation classes of quivers.

Every file in the database is of the form mutation_classes_n.dig6 for some n and

• contains a cPickle.dump of a dictionary where

• the keys are tuples representing irreducible exceptional quiver mutation types of rank n, and

• the values are all quivers in the given mutation class stored in canonical form as (dig6,edges) where

• dig6 is the dig6 data of the given DiGraph, and

• edges are the non-simply-laced edges thereof.

• is obtained by running the function

  sage.combinat.cluster_algebra_quiver.quiver_mutation_type._save_data_dig6(n, types='Exceptional', verbose=False)
SPKG Maintainers

- C. Stump <christian.stump@gmail.com>

Type

optional

Dependencies

Version Information

package-version.txt:

1.0

Equivalent System Packages

See https://repology.org/project/database-mutation-class/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.66 database_odlyzko_zeta: Table of zeros of the Riemann zeta function

Description

Table of zeros of the Riemann zeta function by Andrew Odlyzko.

This package contains the file ‘zeros6’ with the first 2,001,052 zeros of the Riemann zeta function, accurate to within $4\times 10^{-9}$.

Type

optional

Dependencies

- $(SAGERUNTIME)$
Version Information

package-version.txt:

20061209

Equivalent System Packages

See https://repology.org/project/sage-data-odlyzko-zeta/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.67 database_stein_watkins: Database of elliptic curves (full version)

Description

The Stein-Watkins database of elliptic curves (full version)

See http://modular.math.washington.edu/papers/stein-watkins/

This is an optional (huge) package, not included by default.

License

Public Domain

Type

optional

Dependencies

Version Information

package-version.txt:

20110713

Equivalent System Packages

See https://repology.org/project/database-stein-watkins/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.68 database_stein_watkins_mini: Database of elliptic curves (small version)

Description

The Stein-Watkins database of elliptic curves (small version)
See http://modular.math.washington.edu/papers/stein-watkins/
This is an optional package, not included by default.

License

Public Domain

Type

optional

Dependencies

Version Information

package-version.txt:

20070827

Equivalent System Packages

See https://repology.org/project/database-stein-watkins-mini/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.69 database_symbolic_data: Database from the SymbolicData project

Description

The SymbolicData project is set out

• to develop concepts and tools for profiling, testing and benchmarking Computer Algebra Software (CAS) and
• to collect and interlink relevant data and activities from different Computer Algebra Communities.

SymbolicData is an

• inter-community project that has its roots in the activities of different Computer Algebra Communities and
• aims at interlinking these activities using modern Semantic Web concepts.

Tools and data are designed to be used both

• on a local site for special testing and profiling purposes
• and to manage a central repository at www.symbolicdata.org.
License

GNU General Public License

Upstream Contact

- Andreas Nareike <nareike@informatik.uni-leipzig.de>

Type

optional

Dependencies

Version Information

package-version.txt:

| 20070206 |

Equivalent System Packages

See https://repology.org/project/database-symbolic-data/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.70 dateutil: Extensions to the standard Python module datetime

Description

The dateutil module provides powerful extensions to the standard datetime module.

License

Simplified BSD License

Upstream Contact

Author: Gustavo Niemeyer <gustavo@niemeyer.net>

Home page: http://labix.org/python-dateutil

https://pypi.org/project/python-dateutil/
Type

standard

Dependencies

- $(PYTHON)
- six: Python 2 and 3 compatibility utilities
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.8.2

install-requires.txt:

dateutil >=2.8.1

Equivalent System Packages

conda:

$ conda install python-dateutil

macports: install the following packages: py-dateutil

void:

$ sudo xbps-install python3-dateutil

See https://repology.org/project/python:python-dateutil/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.71 debugpy: An implementation of the Debug Adapter Protocol for Python

Description

An implementation of the Debug Adapter Protocol for Python
**License**

MIT

**Upstream Contact**

https://pypi.org/project/debugpy/

**Type**

optional

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

1.6.3

install-requires.txt:

debugpy

**Equivalent System Packages**

conda:

$ conda install debugpy

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

**4.1.72 decorator: Python library providing decorators**

**Description**

Better living through Python with decorators
Type
standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

5.1.1

install-requires.txt:

decorator $\geq 4.4.0$

Equivalent System Packages

conda:

$ conda install decorator

macports: install the following packages: py-decorator

opensuse:

$ sudo zypper install python3-decorator

void:

$ sudo xbps-install python3-decorator

See https://repology.org/project/python:decorator/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.73 deformation: Count points on hypersurfaces using the deformation method

Description

Deformation is a C library for counting points on hypersurfaces using the deformation method, developed by Sebastian Pancratz.
License

GLPv3

Upstream Contact

- Sebastian Pancratz: sebastian.pancratz@gmail.com, sage-devel@googlegroups.com
- We use the fork at https://github.com/sagemath/deformation the fork uses GMP instead of MPIR, and Flint 2.7+

Type

experimental

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- flint: Fast Library for Number Theory

Version Information

package-version.txt:

20210503

Equivalent System Packages

See https://repology.org/project/deformation/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.74 defusedxml: Addresses vulnerabilities of XML parsers and XML libraries

Description

defusedxml addresses vulnerabilities of XML parsers and XML libraries.

It became a dependency of nbconvert starting with nbconvert 5.4.
License
Python Software Foundation License (PSFL)

Upstream Contact
https://pypi.org/project/defusedxml/

Special Update/Build Instructions
None.

Type
standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:
0.7.1

install-requires.txt:
defusedxml >=0.6.0

Equivalent System Packages

conda:
$ conda install defusedxml

macports: install the following packages: py-defusedxml

void:
$ sudo xbps-install python3-defusedxml

See https://repology.org/project/python:defusedxml/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.75 deprecation: A library to handle automated deprecations

Description

A library to handle automated deprecations

License

Apache 2

Upstream Contact

https://pypi.org/project/deprecation/

Type

standard

Dependencies

- ${PYTHON}
- ${PYTHON_TOOLCHAIN}

Version Information

package-version.txt:

2.1.0

install-requires.txt:

deprecation

Equivalent System Packages

conda:

$ conda install deprecation

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.76 distlib: Distribution utilities

Description

Distribution utilities

License

Python license

Upstream Contact

https://pypi.org/project/distlib/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.3.6

install-requires.txt:

distlib

Equivalent System Packages

conda:

$ conda install distlib

void:

$ sudo xbps-install python3-distlib

If the system package is installed, ./configure will check whether it can be used.
4.1.77 docutils: Processing plaintext documentation into useful formats, such as HTML or LaTeX

Description

Docutils is a modular system for processing documentation into useful formats, such as HTML, XML, and LaTeX. For input Docutils supports reStructuredText, an easy-to-read, what-you-see-is-what-you-get plaintext markup syntax.

License

Modified BSD

Upstream Contact

Author: David Goodger
Home Page: http://docutils.sourceforge.net/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.19

install-requires.txt:

docutils >=0.14

Equivalent System Packages

conda:

$ conda install docutils

homebrew:

$ brew install docutils

macports: install the following packages: py-docutils

opensuse:
$ sudo zypper install python3-docutils

void:

$ sudo xbps-install python3-docutils

See https://repology.org/project/docutils/versions, https://repology.org/project/python:docutils/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.78 dot2tex: Create PGF/TikZ commands from Graphviz output

Description

dot2tex is a Python module, whose purpose is to give graphs generated by Graphviz a more LaTeX friendly look and feel. This is accomplished by converting xdot output from Graphviz to a series of PSTricks or PGF/TikZ commands.

See https://github.com/kjellmf/dot2tex/

License

- MIT

Upstream Contact

- Kjell Magne Fauske, km@fauskes.net

Dependencies

graphviz (www.graphviz.org) should be installed and in the path (for example via the graphviz spkg).

preview, a LaTeX package for extracting parts of a document.

Self-tests dependencies:

- graphviz
- texlive-latex-base
- texlive-pictures
- texlive-pstricks

Patches

- remove_test_semicolon.patch:
  Remove the failing semicolon test for the open dot2tex issue #5 - https://github.com/kjellmf/dot2tex/issues/5
**Special Update/Build Instructions**

Make sure corresponding optional doctests still pass:

```bash
sage -t --long --optional=dot2tex,graphviz,sage src/
```

**Type**

optional

**Dependencies**

- `$(PYTHON)`
- `$(PYTHON_TOOLCHAIN)`
- `pyparsing: A Python parsing module`

**Version Information**

package-version.txt:

```
2.11.3.p0
```

install-requires.txt:

```
dot2tex >=2.11.3
```

**Equivalent System Packages**

**arch:**

```bash
$ sudo pacman -S dot2tex
```

**conda:**

```bash
$ conda install dot2tex
```

**macports:** install the following packages: dot2tex

See [https://repology.org/project/dot2tex/versions](https://repology.org/project/dot2tex/versions), [https://repology.org/project/python:dot2tex/versions](https://repology.org/project/python:dot2tex/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)
4.1.79 dsdp: Semidefinite programming solver

Description

Implementation of an interior-point method for semidefinite programming. It provides primal and dual solutions, exploits low-rank structure and sparsity in the data, and has relatively low memory requirements for an interior-point method. It allows feasible and infeasible starting points and provides approximate certificates of infeasibility when no feasible solution exists. The dual-scaling algorithm implemented in this package has a convergence proof and worst-case polynomial complexity under mild assumptions on the data.

License

Permissive open source license https://www.mcs.anl.gov/hs/software/DSDP/Copyright.txt

Upstream Contact

https://www.mcs.anl.gov/hs/software/DSDP/

Type

optional

Dependencies

- $(BLAS)
- cmake: A cross-platform build system generator

Version Information

package-version.txt:

5.8

Equivalent System Packages

arch:

$ sudo pacman -S dsdp

conda:

$ conda install dsdp

Debian/Ubuntu:

$ sudo apt-get install libdsdp-dev

Fedora/Redhat/CentOS:
$ sudo yum install DSDP-devel

freebsd:

$ sudo pkg install math/dsdp

gentoo:

$ sudo emerge sci-libs/dsdp

macports: install the following packages: DSDP

See https://repology.org/project/dsdp/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.80 **e_antic: Real embedded number fields**

**Description**

e-antic is a C library for exact computations with real embedded number field maintained by Vincent Delecroix.

Website: https://github.com/videlec/e-antic

**License**

e-antic is licensed GPL v3.

**Upstream Contact**

- https://github.com/videlec/e-antic

**Type**

optional

**Dependencies**

- $\text{MP\_LIBRARY}$
- \textit{flint}: Fast Library for Number Theory
- \textit{arb}: Arbitrary-precision floating-point ball arithmetic
- \textit{antic}: Algebraic Number Theory In C
- \textit{boost\_cropped}: Portable C++ libraries (subset needed for Sage)
**Version Information**

package-version.txt:

```
1.3.0
```

**Equivalent System Packages**

arch:

```
$ sudo pacman -S e-antic
```

conda:

```
$ conda install libeantic
```

Debian/Ubuntu:

```
$ sudo apt-get install libeantic-dev
```

Fedora/Redhat/CentOS:

```
$ sudo yum install e-antic-devel
```

freebsd:

```
$ sudo pkg install math/e-antic
```

opensuse:

```
$ sudo zypper install e-antic-devel
```

See [https://repology.org/project/e-antic/versions](https://repology.org/project/e-antic/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/sagemath/sage/issues/27330)

### 4.1.81 ecl: An implementation of the Common Lisp language

**Description**

ECL is an implementation of the Common Lisp language as defined by the ANSI X3J13 specification. The most relevant features:

- A bytecodes compiler and interpreter.
- Compiles Lisp also with any C/C++ compiler.
- It can build standalone executables and libraries.
- ASDF, Sockets, Gray streams, MOP, and other useful components.
- Extremely portable.
- A reasonable license.
ECL supports the operating systems Linux, FreeBSD, NetBSD, OpenBSD, Solaris and Windows, running on top of the Intel, Sparc, Alpha and PowerPC processors. Porting to other architectures should be rather easy.

Website: https://common-lisp.net/project/ecl/

License

- LGPL V2+ or compatible - for details see
  https://common-lisp.net/project/ecl/static/manual/Copyrights.html#Copyright-of-ECL

Upstream Contact

- the ECL mailing list - see https://mailman.common-lisp.net/listinfo/ecl-devel

Special Update/Build Instructions

- Note: for the time being, ECL is built single threaded library as it seems to interact badly with the pexpect interface and Sage’s signal handling when built multithreaded.

- Do NOT quote SAGE_LOCAL when setting CPPFLAGS and/or LDFLAGS, in spkg-install as this caused the build to break. See github issue #10187#comment:117

- TODO: Add the ECL test suite, and an spkg-check file to run it.

- TODO: Make ECL use Sage’s Boehm GC on MacOS X as well (but perhaps put some changes from ECL’s into Sage’s Boehm GC), then remove the src/src/gc directory, too.

Type

standard

Dependencies

- $(MP_LIBRARY)
- readline: Command line editing library
- gc: The Boehm-Demers-Weiser conservative garbage collector
- libffi: A portable foreign-function interface library

Version Information

package-version.txt:

21.2.1
Equivalent System Packages

alpine: install the following packages: ecl-dev

arch:

```
$ sudo pacman -S ecl
```

conda:

```
$ conda install ecl
```

Debian/Ubuntu:

```
$ sudo apt-get install ecl
```

Fedora/Redhat/CentOS:

```
$ sudo yum install ecl
```

freebsd:

```
$ sudo pkg install lang/ecl
```

gentoo:

```
$ sudo emerge dev-lisp/ecl
```

homebrew:

```
$ brew install ecl
```

macports: install the following packages: ecl

nix:

```
$ nix-env --install ecl
```

void:

```
$ sudo xbps-install ecl
```

See https://repology.org/project/ecl/versions

If the system package is installed, `./configure` will check whether it can be used.

4.1.82 eclib: Enumerating and computing with elliptic curves defined over the rational numbers

Description

John Cremona’s programs for enumerating and computing with elliptic curves defined over the rational numbers.

mwrank is a program written in C++ for computing Mordell-Weil groups of elliptic curves over Q via 2-descent. It is available as source code in the eclib package, which may be distributed under the GNU General Public License, version 2, or any later version.
mwrank is now only distributed as part of eclib. eclib is also included in Sage, and for most potential users the easiest way to run mwrank is to install Sage (which also of course gives you much much more). I no longer provide a source code distribution of mwrank by itself: use eclib instead.

License

eclib is licensed GPL v2+.

Upstream Contact

- **Author:** John Cremona
- **Email:** john.cremona@gmail.com
- **Website:** http://homepages.warwick.ac.uk/staff/J.E.Cremona/mwrank/index.html
- **Repository:** https://github.com/JohnCremona/eclib

Type

standard

Dependencies

- **pari:** Computer algebra system for fast computations in number theory
- **ntl:** A library for doing number theory
- **flint:** Fast Library for Number Theory

Version Information

package-version.txt:

20230424

Equivalent System Packages

arch:

```bash
$ sudo pacman -S eclib
```

conda:

```bash
$ conda install eclib
```

Debian/Ubuntu:

```bash
$ sudo apt-get install libec-dev eclib-tools
```

Fedora/Redhat/CentOS:
$ sudo yum install eclib eclib-devel

defrebsd:

$ sudo pkg install math/eclib

gentoo:

$ sudo emerge sci-mathematics/eclib[flint]

nix:

$ nix-env --install eclib

void:

$ sudo xbps-install eclib-devel

See https://repology.org/project/eclib/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.83 ecm: Elliptic curve method for integer factorization

Description

GMP-ECM - Elliptic Curve Method for Integer Factorization
Sources can be obtained from https://gitlab.inria.fr/zimmerma/ecm

License

LGPL v3+

Upstream Contact

• ecm-discuss@inria.fr

Special Update/Build Instructions

• GMP-ECM comes with a self-tuning feature; we could support that as an option ($SAGE_TUNE_*=yes) in the future.

• ECM currently does not (by itself) use the CC and CFLAGS settings from ‘gmp.h’ since we pass (other) options in CFLAGS, and CC is set by Sage and might not get set by the user. We now at least partially fix that such that “optimized” code generation options (‘-mcpu=…’, ‘-mtune=…’) are used by gcc. Of course a user can also manually enable them by setting the “global” CFLAGS to e.g. ‘-march=native’ on x86[-64] systems, or ‘-mcpu=…’ and ‘-mtune=…’ on other architectures where “native” isn’t supported. Note that this doesn’t affect the packages’ selection of processor-specific optimized [assembly] code. ‘spkg-install’ already reads the settings from Sage’s and also a system-wide GMP now, but doesn’t (yet) use all of them. If SAGE_FAT_BINARY=”yes”, we should avoid too specific settings of “-mcpu=…”, and perhaps pass a more generic “-host=…” to ‘configure’.
• We currently work around a linker bug on MacOS X 10.5 PPC (with GCC 4.2.1) which breaks ‘configure’ if debug symbols are enabled. This *might* get fixed in later upstream releases.
• We could save some space by removing the src/build.vc10/ directory which isn’t used in Sage. (It gets probably more worth in case also directories / files for later versions of Microsoft Visual C get added.)

**Type**

standard

**Dependencies**

• $(_MP_LIBRARY)

**Version Information**

package-version.txt:

7.0.5

**Equivalent System Packages**

conda:

```bash
$ conda install ecm
```

Debian/Ubuntu:

```bash
$ sudo apt-get install gmp-ecm libecm-dev
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install gmp-ecm gmp-ecm-devel
```

freebsd:

```bash
$ sudo pkg install math/gmp-ecm
```

macports: install the following packages: gmp-ecm

```bash
$ nix-env --install ecm
```

void:

```bash
$ sudo xbps-install ecm-devel
```

See https://repology.org/project/gmp-ecm/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.84 ecos_python: Embedded Cone Solver (Python wrapper)

Description

This is the Python package for ECOS: Embedded Cone Solver. It vendors ECOS.

License

GPLv3

Upstream Contact

https://pypi.org/project/ecos/

Type

optional

Dependencies

- $(PYTHON)
- numpy: Package for scientific computing with Python
- scipy: Scientific tools for Python
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.0.12

install-requires.txt:

ecos

Equivalent System Packages

conda:

$ conda install ecos

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.85 editables: Editable installations

Description

Editable installations

License

MIT

Upstream Contact

https://pypi.org/project/editables/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.3

install-requires.txt:

editables

Equivalent System Packages

conda:

$ conda install editables

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.86 elliptic_curves: Databases of elliptic curves

Description

Includes two databases:

- A small subset of John Cremona’s database of elliptic curves up to conductor 10000.
- William Stein’s database of interesting curves

Upstream Contact

cremona_mini

- Author: John Cremona
- Email: john.cremona@gmail.com
- Website: http://johncremona.github.io/ecdata/

ellcurves

- Author: William Stein
- Email: wstein@gmail.com

Type

standard

Dependencies

- $(PYTHON)

Version Information

package-version.txt:

0.8.1

Equivalent System Packages

conda:

$ conda install sagemath-db-elliptic-curves

See https://repology.org/project/sagemath-elliptic-curves/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.87 entrypoints: Discover and load entry points from installed Python packages

Description

Discover and load entry points from installed packages.

Upstream Contact

https://github.com/takluyver/entrypoints

Special Update/Build Instructions

Upstream does not provide a source tarball, so the tarball was taken from github and renamed.
The source tarball does not contain setup.py, so we put the setup commands in spkg-install.

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- flit_core: Distribution-building parts of Flit. See flit package for more information
- tomli: A lil’ TOML parser

Version Information

package-version.txt:

0.4

install-requires.txt:

entrypoints >=0.3

Equivalent System Packages

conda:

$ conda install entrypoints

macports: install the following packages: py-entrypoints

void:

$ sudo xbps-install python3-entrypoints
See https://repology.org/project/entrypoints/versions, https://repology.org/project/python:entrypoints/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.88 executing: Get the currently executing AST node of a frame, and other information

Description

Get the currently executing AST node of a frame, and other information

License

MIT

Upstream Contact

https://pypi.org/project/executing/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
1.2.0
```

install-requires.txt:

```
executing
```

Equivalent System Packages

conda:

```
$ conda install executing
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.89 fastjsonschema: Fastest Python implementation of JSON schema

Description

Fastest Python implementation of JSON schema

License

BSD

Upstream Contact

https://pypi.org/project/fastjsonschema/

Type

standard

Dependencies

- `$(PYTHON)`
- `$(PYTHON_TOOLCHAIN)`

Version Information

package-version.txt:

2.16.2

install-requires.txt:

fastjsonschema

Equivalent System Packages

conda:

$ conda install python-fastjsonschema

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.90  fflas_ffpack: Dense linear algebra over word-size finite fields

Description

FFLAS-FFPACK is a LGPL-2.1+ source code library for dense linear algebra over word-size finite fields.
http://linbox-team.github.io/fflas-ffpack/

License

LGPL V2.1 or later

Upstream Contact

• <ffpack-devel@googlegroups.com>

Type

standard

Dependencies

• $(MP_LIBRARY)
• givaro: C++ library for arithmetic and algebraic computations
• gsl: The GNU Scientific Library
• $(BLAS)
• pkgconfig: An implementation of the pkg-config spec

Version Information

package-version.txt:

2.4.3.p0

Equivalent System Packages

arch:

$ sudo pacman -S fflas-ffpack

conda:

$ conda install fflas-ffpack

Debian/Ubuntu:

$ sudo apt-get install fflas-ffpack
Fedora/Redhat/CentOS:

$ sudo yum install fflas-ffpack-devel

freebsd:

$ sudo pkg install math/fflas-ffpack

gentoo:

$ sudo emerge sci-libs/fflas-ffpack

nix:

$ nix-env --install fflas-ffpack

opensuse:

$ sudo zypper install "pkgconfig(fflas-ffpack)"

void:

$ sudo xbps-install fflas-ffpack

See https://repology.org/project/fflas-ffpack/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.91 ffmpeg: ffmpeg video converter

Description

ffmpeg is a very fast video and audio converter that can also grab from a live audio/video source. It can also convert between arbitrary sample rates and resize video on the fly with a high quality polyphase filter.

License

“FFmpeg is licensed under the GNU Lesser General Public License (LGPL) version 2.1 or later. However, FFmpeg incorporates several optional parts and optimizations that are covered by the GNU General Public License (GPL) version 2 or later. If those parts get used the GPL applies to all of FFmpeg.”

http://ffmpeg.org/legal.html

Upstream Contact

http://ffmpeg.org/
Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: ffmpeg

arch:

$ sudo pacman -S ffmpeg

conda:

$ conda install imageio-ffmpeg

Debian/Ubuntu:

$ sudo apt-get install ffmpeg

Fedora/Redhat/CentOS:

freebsd:

$ sudo pkg install multimedia/ffmpeg

homebrew:

$ brew install ffmpeg

macports: install the following packages: ffmpeg

nix:

$ nix-env --install ffmpeg

opensuse:

$ sudo zypper install ffmpeg

void:

$ sudo xbps-install ffmpeg

See https://repology.org/project/ffmpeg/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.92 filelock: A platform independent file lock

Description

A platform independent file lock.

License

Public Domain <http://unlicense.org>

Upstream Contact

https://pypi.org/project/filelock/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.8.0

install-requires.txt:

filelock

Equivalent System Packages

conda:

$ conda install filelock

void:

$ sudo xbps-install python3-filelock

If the system package is installed, ./configure will check whether it can be used.
4.1.93 flint: Fast Library for Number Theory

Description

FLINT is a C library for doing number theory, maintained by William Hart.
Website: http://www.flintlib.org

License

FLINT is licensed GPL v2+.

Upstream Contact

- flint-devel Google Group (http://groups.google.co.uk/group/flint-devel)
- William Hart

Type

standard

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- ntl: A library for doing number theory

Version Information

package-version.txt:

2.8.4

Equivalent System Packages

conda:

$ conda install libflint

cygwin:

$ apt-cyg install libflint-devel

Debian/Ubuntu:

$ sudo apt-get install libflint-dev

Fedora/Redhat/CentOS:

4.1. Details of external packages
$ sudo yum install flint flint-devel

tiny:
$ sudo pkg install math/flint2

gentoo:
$ sudo emerge sci-mathematics/flint[ntl]

homebrew:
$ brew install flint

macports: install the following packages: flint

nix:
$ nix-env --install flint

opensource:
$ sudo zypper install flint-devel

void:
$ sudo xbps-install flintlib-devel

See https://repology.org/project/flint/versions
If the system package is installed, `./configure` will check whether it can be used.

4.1.94 flit_core: Distribution-building parts of Flit. See flit package for more information

Description

Distribution-building parts of Flit. See flit package for more information

License

Upstream Contact

https://pypi.org/project/flit-core/
Type

standard

Dependencies

- $(PYTHON)
- *pip*: Tool for installing and managing Python packages

Version Information

package-version.txt:

3.7.1

install-requires.txt:

flit-core

Equivalent System Packages

conda:

$ conda install flit-core

void:

$ sudo xbps-install python3-flit_core

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

4.1.95 fonttools: Tools to manipulate font files

Description

Tools to manipulate font files

License

MIT
Upstream Contact

https://pypi.org/project/fonttools/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler

Version Information

package-version.txt:

4.28.4

install-requires.txt:

fonttools

Equivalent System Packages

conda:

$ conda install  fonttools

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.96 fplll: Lattice algorithms, including LLL with floating-point orthogonalization

Description

fplll contains implementations of several lattice algorithms. The implementation relies on floating-point orthogonalization, and LLL is central to the code, hence the name.

Website: https://github.com/fplll/fplll
License

- LGPL V2.1+

Upstream Contact

- Martin Albrecht <martinralbrecht+fplll@googlemail.com>
- Mailing List https://groups.google.com/forum/#!forum/fplll-devel

Type

standard

Dependencies

- $(MP_LIBRARY)
  - mpfr: Multiple-precision floating-point computations with correct rounding

Version Information

package-version.txt:

5.4.4

Equivalent System Packages

conda:

$ conda install fplll

Debian/Ubuntu:

$ sudo apt-get install libfplll-dev

Fedora/Redhat/CentOS:

$ sudo yum install libfplll libfplll-devel

freebsd:

$ sudo pkg install math/fplll

gentoo:

$ sudo emerge sci-libs/fplll

homebrew:

$ brew install fplll
External Packages, Release 10.0

opensuse:

```bash
$ sudo zypper install "pkgconfig(fplll)" fplll-devel fplll
```

void:

```bash
$ sudo xbps-install fplll-devel
```

See https://repology.org/project/fplll/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.97 fpylll: Python interface for FPLL

**Description**

A Python interface for https://github.com/fplll/fplll (Lattice algorithms using floating-point arithmetic)

**License**

GPL version 2 or later

**Upstream Contact**

https://github.com/fplll/fpylll

**Type**

standard

**Dependencies**

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- cysignals: Interrupt and signal handling for Cython
- numpy: Package for scientific computing with Python
- fplll: Lattice algorithms, including LLL with floating-point orthogonalization

**Version Information**

package-version.txt:

`0.5.9`

install-requires.txt:

`fpylll >=0.5.9, <=0.5.9`
Equivalent System Packages

conda:

```
$ conda install fpylll
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.98 freetype: A free, high-quality, and portable font engine

Description

From the documentation:

FreeType is a software font engine that is designed to be small, efficient, highly customizable, and portable while capable of producing high-quality output (glyph images). It can be used in graphics libraries, display servers, font conversion tools, text image generation tools, and many other products as well.

Note that FreeType is a font service and doesn’t provide APIs to perform higher-level features like text layout or graphics processing (e.g., colored text rendering, ‘hollowing’, etc.). However, it greatly simplifies these tasks by providing a simple, easy to use, and uniform interface to access the content of font files.

Please note that ‘FreeType’ is also called ‘FreeType 2’, to distinguish it from the old, deprecated ‘FreeType 1’ library, a predecessor no longer maintained and supported.

The package in Sage is called freetype (in lowercase).

License

- FreeType (BSD-like)
- GNU Public License v2

From the documentation:

FreeType is released under two open-source licenses: our own BSD-like FreeType License and the GNU Public License, Version 2. It can thus be used by any kind of projects, be they proprietary or not.

Upstream Contact

- home: https://www.freetype.org
- repo:
  - official: http://git.savannah.gnu.org/cgit/freetype
  - mirror: https://github.com/aseprite/freetype2/
**Type**
standard

**Dependencies**
- **libpng**: Bitmap image support
- **bzip2**: High-quality data compressor

**Version Information**

package-version.txt:

2.10.4

**Equivalent System Packages**

conda:

```bash
$ conda install freetype
```

cygwin:

```bash
$ apt-cyg install libfreetype-devel
```

Debian/Ubuntu:

```bash
$ sudo apt-get install libfreetype6-dev
```

glibc:

```bash
$ sudo pkg install print/freetype2
```

homebrew:

```bash
$ brew install freetype
```

macports: install the following packages: freetype

```bash
$ nix-env --install freetype
```

opensuse:

```bash
$ sudo zypper install "pkgconfig(freetype2)"
```

slackware:

```bash
$ sudo slackpkg install freetype harfbuzz glib glib2
```

void:
$ sudo xbps-install freetype-devel

See https://repology.org/project/freetype/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.99 fricas: A general purpose computer algebra system

Description
FriCAS is a general purpose computer algebra system.

License
Modified BSD license.

Upstream Contact
http://fricas.sourceforge.net/

Type
optional

Dependencies
  • ecl: An implementation of the Common Lisp language

Version Information
package-version.txt:

1.3.8.p1

Equivalent System Packages
macports: install the following packages: fricas
See https://repology.org/project/fricas/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.100 frobby: Computations on monomial ideals

Description

The software package Frobbby provides a number of computations on monomial ideals. The current main feature is the socle of a monomial ideal, which is largely equivalent to computing the maximal standard monomials, the Alexander dual or the irreducible decomposition.

Operations on monomial ideals are much faster than algorithms designed for ideals in general, which is what makes a specialized library for these operations on monomial ideals useful.

License

- GPL version 2.0 or later

Upstream Contact

- http://www.broune.com/frobbby/
- https://github.com/Macaulay2/frobbby

Special Update/Build instructions

Download Frobbby at www.broune.com/ and then type “make spkg VER=blah” which will create an spkg named frobbby-VER.spkg in bin/. The files related to doing this is in the sage/ sub-directory of the Frobbby source distribution.

Type

optional

Dependencies

- $(MP_LIBRARY)

Version Information

package-version.txt:

0.9.0.p2

Equivalent System Packages

See https://repology.org/project/frobbby/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.101 furo: A clean customizable Sphinx documentation theme

Description

A clean customizable Sphinx documentation theme.

License

Upstream Contact

https://pypi.org/project/furo/

Type

standard

Dependencies

- $(PYTHON)
- beautifulsoup4: Screen-scraping library
- sphinx: Python documentation generator
- pygments: Generic syntax highlighter
- sphinx_basic_ng: A modern skeleton for Sphinx themes.
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.9.29

install-requires.txt:

furo

Equivalent System Packages

conda:

$ conda install furo

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.102 gambit: Computations on finite, noncooperative games

Description

Gambit is a set of software tools for doing computation on finite, noncooperative games. The Gambit Project was founded in the mid-1980s by Richard McKelvey at the California Institute of Technology.

License

GPL v2+

Upstream Contact

- Website: http://www.gambit-project.org/
- Mailing List: http://sourceforge.net/p/gambit/mailman/gambit-devel/

Dependencies

- python
- cython
- setuptools
- IPython
- scipy

Type

experimental

Dependencies

- cython: C-Extensions for Python, an optimizing static compiler
- $\$(PYTHON\_TOOLCHAIN)$

Version Information

package-version.txt:

15.1.1.p0
Equivalent System Packages

homebrew:

```
$ brew install gambit
```

See https://repology.org/project/gambit-game-theory/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.103 gap: Groups, Algorithms, Programming - a system for computational discrete algebra

Description

GAP is a system for computational discrete algebra, with particular emphasis on Computational Group Theory. GAP provides a programming language, a library of thousands of functions implementing algebraic algorithms written in the GAP language as well as large data libraries of algebraic objects. See also the overview and the description of the mathematical capabilities. GAP is used in research and teaching for studying groups and their representations, rings, vector spaces, algebras, combinatorial structures, and more. The system, including source, is distributed freely. You can study and easily modify or extend it for your special use.

This is a stripped-down version of GAP. The databases, which are architecture-independent, are in a separate package.

Upstream Contact

https://www.gap-system.org

Mailing list at https://mail.gap-system.org/mailman/listinfo/gap

Special Update/Build Instructions

This is a stripped-down version of GAP. The downloading of the sources and removal of unneeded parts is done by the script spkg-src. When you update GAP, please also update and use the spkg-src script.

- Do we really want to copy everything from the build directory???
  
  You need the full GAP tree to compile/install many GAP packages.

- There’s apparently a command missing (in spkg-install) building the (HTML?) documentation. Earlier changelog entries as well as the description above state the documentation was removed from the upstream sources... Since the (pre-)built HTML documentation is currently included, I’ve commented out some lines in that part of spkg-install. -leif
Patches

Type

standard

Dependencies

• ncurses: Classic terminal output library
• readline: Command line editing library
• zlib: Data compression library
• $(MP_LIBRARY)

Version Information

package-version.txt:

4.12.2

Equivalent System Packages

arch:

$ sudo pacman -S gap

conda:

$ conda install gap-defaults>=4.12.2

Debian/Ubuntu:

$ sudo apt-get install libgap-dev

freebsd:

$ sudo pkg install math/gap

nix:

$ nix-env --install gap

See https://repology.org/project/gap/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.104 gap3: A minimal distribution of GAP 3 containing packages that have no equivalent in GAP 4

Description

This package installs Jean Michel’s pre-packaged GAP3, which is a minimal GAP3 distribution containing packages that have no equivalent in GAP4.

Below is the full description from Jean Michel’s webpage (accessed 23 July 2015).

A pre-packaged GAP3 with everything you need

To help people who are just interested in GAP3 because they need a package which has not been ported to GAP4, I have prepared an easy-to install minimal GAP3 distribution containing an up-to-date versions of the packages:

anusq, arep, autag, chevie, cryst, dce, grim, matrix, metatxe, monoid, nq, pcqa, sisyphos, specht, ve, vkcurve.

These packages have been chosen since most have no equivalent in GAP4. They are autoloaded when starting gap.

This distribution includes only partial lists of small groups, 2-groups, 3-groups, character tables from the Atlas and tables of marks. It does not include either the packages:

anupq, grape, kbmag, xgap, cohomolo, gliss, guava, xmod

which have some equivalent in GAP4. You can get these extra features at

http://www.math.rwth-aachen.de/~Frank.Luebeck/gap/GAP3

In this distribution:

• The on-line help includes the documentation of the included packages.
• The html documentation (htm/index.html) also does.
• The manual (manual.pdf) also does.

License

Most parts of the GAP distribution, including the core part of the GAP system, are distributed under the terms of the GNU General Public License (see http://www.gnu.org/licenses/gpl.html or the file GPL in the etc directory of the GAP installation).

SPKG Maintainers

• Christian Stump <christian.stump@gmail.com>
Upstream Contact

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Special Update/Build Instructions

The difference between the distributed tarball and Jean Michel’s original tarball also contains the binaries

Patches

None

Type

experimental

Dependencies

Version Information

package-version.txt:

04 jul 17

Equivalent System Packages

(none known)

4.1.105 gap_jupyter: Jupyter kernel for GAP

Description

Jupyter kernel for GAP
This wrapper-kernel is a Jupyter kernel for the GAP Computer Algebra System based on the same ideas as the bash wrapper kernel.

License

3-Clause BSD License
Upstream Contact

- https://github.com/gap-packages/jupyter-gap

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- ipython: Interactive computing environment with an enhanced interactive Python shell
- gap: Groups, Algorithms, Programming - a system for computational discrete algebra

Version Information

package-version.txt:

0.9

install-requires.txt:

gap_jupyter >=0.9

Equivalent System Packages

conda:

$ conda install gap

See https://repology.org/project/gap-jupyterkernel/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.106 gap_packages: A collection of GAP packages

Description

Several “official” and “undeposited” GAP packages available from https://www.gap-system.org/Packages/packages.html
External Packages, Release 10.0

Upstream Contact

Mailing list at https://mail.gap-system.org/mailman/listinfo/gap

Dependencies

- GAP (a standard spkg)

TODO

The crystallographic group packages are untested/untestable. They rely on polymake and the dependency “cryst” is missing. This needs to be cleaned up.

Notes

A brief description of each package follows:

cohomolo - The cohomolo package is a GAP interface to some C programs for computing Schur multipliers and covering groups of finite groups and first and second cohomology groups of finite groups acting on finite modules. (Author: Max Horn, Markus Pfeiffer)

CoReLG - Contains functionality for working with real semisimple Lie algebras. (Author: Heiko Dietrich, Paolo Faccin, Willem Adriaan de Graaf)

crime - package to compute the cohomology ring of finite p-groups, induced maps, and Massey products. (Author: Marcus Bishop)

cryst - Computing with crystallographic groups (Authors: Bettina Eick, Franz Gähler, Werner Nickel)

CTblLib - The GAP Character Table Library (Author: Thomas Breuer)

DESIGN is a package for classifying, partitioning and studying block designs. (Author: Leonard H. Soicher)

FactInt is a package providing routines for factoring integers, in particular:

- Pollard’s p-1
- Williams’ p+1
- Elliptic Curves Method (ECM)
- Continued Fraction Algorithm (CFRAC)
- Multiple Polynomial Quadratic Sieve (MPQS)

(Author: Stefan Kohl)

GAPDoc is a package containing a definition of a structure for GAP documentation, based on XML. It also contains conversion programs for producing text-, DVI-, PDF- or HTML-versions of such documents, with hyperlinks if possible. (Authors: Frank Luebeck, Max Neunhoeffer)

GBNP - The GBNP package provides algorithms for computing Grobner bases of noncommutative polynomials with coefficients from a field implemented in GAP and with respect to the “total degree first then lexicographical” ordering. Further provided are some variations, such as a weighted and truncated version and a tracing facility. The word “algorithm” is to be interpreted loosely here: in general one cannot expect such an algorithm to terminate, as it would imply solvability of the word problem for finitely presented (semi)groups. (Authors: A.M. Cohen, J.W. Knopper)

GRAPE is a package for computing with graphs and groups, and is primarily designed for constructing and analysing graphs related to groups, finite geometries, and designs. (Author: Leonard H. Soicher)
GUAVA is included here, and with Sage standard.

HAP (Homological Algebra Programming) is a GAP package providing some functions for group cohomology computation. (Author: Graham Ellis)

HAPcryst - an extension package for HAP, which allows for group cohomology computation for a wider class of groups. (Author: Marc Roeder)

hecke - Provides functions for calculating decomposition matrices of Hecke algebras of the symmetric groups and q-Schur algebras. Hecke is a port of the GAP 3 package Specht 2.4 to GAP 4. (Author: Dmitriy Traytel)

LAGUNA - this package provides functionality for calculation of the normalized unit group of the modular group algebra of the finite p-group and for investigation of Lie algebra associated with group algebras and other associative algebras. (Authors : Victor Bovdi, Alexander Konovalov, Richard Rossmanith, Csaba Schneider)

liealgdb - A database of Lie algebras (Author: Serena Cicalo’, Willem Adriaan de Graaf, Csaba Schneider)

LiePRing - Database and algorithms for Lie p-rings (Author: Michael Vaughan-Lee, Bettina Eick)

LieRing - contains functionality for working with finitely presented Lie rings and the Lazard correspondence. (Author: Serena Cicalo’, Willem Adriaan de Graaf)

loops - Provides researchers in nonassociative algebra with a computational tool that integrates standard notions of loop theory with libraries of loops and group-theoretical algorithms of GAP. The package also expands GAP toward nonassociative structures. (Authors: Gabor Nagy, Petr Vojtechovsky)

mapclass - The package calculates the mapping class group orbits for a given finite group. (Authors: Adam James, Kay Magaard, Sergey Shpectorov, Helmut Volklein)

polymake - an interface with the (standalone) polymake program used by HAPcryst. (Author: Marc Roeder)

qpa - Quivers and Path Algebras provides data structures and algorithms for doing computations with finite dimensional quotients of path algebras, and finitely generated modules over such algebras. The current version of the QPA package has data structures for quivers, quotients of path algebras, and modules, homomorphisms and complexes of modules over quotients of path algebras. (Authors: Edward Green, Oeyvind Solberg)

quagroup - Contains functionality for working with quantized enveloping algebras of finite-dimensional semisimple Lie algebras. (Author: Willem Adriaan de Graaf)

repsn - The package provides GAP functions for computing characteristic zero matrix representations of finite groups. (Author: Vahid Dabbaghian)

sla - a package for doing computations with simple Lie algebras (Author: Willem Adriaan de Graaf)

SONATA (“System Of Nearrings And Their Applications”) is a package which constructs finite nearrings and related objects. (Authors: Erhard Aichinger, Franz Binder, Jürgen Ecker, Peter Mayr, Christof Noebauer)

TORIC is a GAP package for computing with toric varieties. (Author: David Joyner)

**Type**

optional
**Dependencies**

- gap: Groups, Algorithms, Programming - a system for computational discrete algebra
- libsemigroups: Library for semigroups and monoids
- planarity: Planarity-related graph algorithms
- $(SAGERUNTIME)$

**Version Information**

package-version.txt:

```
4.12.2
```

**Equivalent System Packages**

conda:

```
$ conda install gap
```

See https://repology.org/project/gap/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.107 gast: Python AST that abstracts the underlying Python version

**Description**

Python AST that abstracts the underlying Python version

**License**

BSD 3-Clause

**Upstream Contact**

https://pypi.org/project/gast/

**Type**

standard
Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.5.3

install-requires.txt:

gast

Equivalent System Packages

conda:

$ conda install gast

void:

$ sudo xbps-install python3-gast

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.108 gc: The Boehm-Demers-Weiser conservative garbage collector

Description

The Boehm-Demers-Weiser conservative garbage collector.

License

- Permissive BSD + GPL 2.0+

Upstream Contact

Webpage: http://www.hboehm.info/gc/
Email List: bdwgc@lists.opendylan.org
Special Update/Build Instructions

None.

Patches

• cygwin64.patch: let libgc build on Cygwin64.

Type

standard

Dependencies

• libatomic_ops: Access hardware-provided atomic memory update operations

Version Information

package-version.txt:
8.0.4

Equivalent System Packages

arch:

$ sudo pacman -S gc

conda:

$ conda install bdw-gc

cygwin:

$ apt-cyg install libgc-devel

Debian/Ubuntu:

$ sudo apt-get install libgc-dev

Fedora/Redhat/CentOS:

$ sudo yum install gc gc-devel

freebsd:

$ sudo pkg install devel/boehm-gc devel/boehm-gc-threaded

genoot:
$ sudo emerge dev-libs/boehm-gc

homebrew:

$ brew install bdw-gc

macports: install the following packages: boehmgc

opensuse:

$ sudo zypper install "pkgconfig(bdw-gc)"

slackware:

$ sudo slackpkg install gc

void:

$ sudo xbps-install gc-devel

See https://repology.org/project/boehm-gc/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.109 gcc: The GNU Compiler Collection or other suitable C and C++ compilers

**Description**

This package represents the required C and C++ compilers.

- GCC (GNU Compiler Collection) versions 8.x to 12.x are supported.
- Clang (LLVM) is also supported.

The required Fortran compiler is represented by the package gfortran.

You can pass the names of compilers to use to ./configure using the environment variables CC, CXX, and FC, for C, C++, and Fortran compilers, respectively.

For example, if your C compiler is clang, your C++ compiler is clang++, and your Fortran compiler is flang, then you would need to run:

$ ./configure CC=clang CXX=clang++ FC=flang

Vendor and versions of the C and C++ compilers should match.

Users of older Linux distributions (in particular, ubuntu-xenial or older, debian-stretch or older, linuxmint-18 or older) should upgrade their systems before attempting to install Sage from source. Users of ubuntu-bionic, linuxmint-19.x, and opensuse-15.x can install a versioned gcc system package and then use:

$ ./configure CC=gcc-8 CXX=g++-8 FC=gfortran-8

or similar. Users on ubuntu can also install a modern compiler toolchain using the ubuntu-toolchain-r ppa. On ubuntu-trusty, also the package binutils-2.26 is required; after installing it, make it available using export PATH="/usr/lib/binutils-2.26/bin:$PATH". Instead of upgrading their distribution, users of centos-7 can install a modern compiler toolchain using Redhat’s devtoolset.

### 4.1. Details of external packages
This package uses the non-standard default `configure --with-system-gcc=force`, giving an error at configure time when no suitable system compilers are configured.

You can override this using `./configure --without-system-gcc`. In this case, Sage builds and installs the GNU Compiler Collection, including the C, C++ and Fortran compiler. This is not recommended. You will need suitable C and C++ compilers from which GCC can bootstrap itself. There are some known problems with old assemblers, in particular when building the `ecm` and `fflas_ffpack` packages. You should ensure that your assembler understands all instructions for your processor. On Linux, this means you need a recent version of `binutils` (not provided by an SPKG); on macOS you need a recent version of Xcode.

(Installing the `gfortran` SPKG becomes a no-op in this case.)

Building Sage from source on Apple Silicon (M1/M2) requires the use of Apple’s Command Line Tools, and those tools include a suitable compiler. Sage’s `gcc` SPKG is not suitable for M1/M2; building it will likely fail.

License

GPL version 2 or version 3

Upstream Contact

https://gcc.gnu.org/

Type

standard

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
- zlib: Data compression library
- xz: General-purpose data compression software

Version Information

package-version.txt:

```
12.2.0
```
Equivalent System Packages

arch:

$ sudo pacman -S gcc

cygwin:

$ apt-cyg install gcc-core gcc-g++ gcc-fortran

Debian/Ubuntu:

$ sudo apt-get install gcc g++

Fedora/Redhat/CentOS:

$ sudo yum install gcc gcc-c++ gcc-gfortran

freebsd:

$ sudo pkg install lang/gcc9

homebrew:

$ brew install gcc

opensuse:

$ sudo zypper install gcc-c++

void:

$ sudo xbps-install gcc

See https://repology.org/project/gcc/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.110 gdb: The GNU Project debugger

Description

GDB, the GNU Project debugger, allows you to see what is going on “inside” another program while it executes – or what another program was doing at the moment it crashed.
License

GPL v3+

Upstream Contact

http://www.gnu.org/software/gdb/

Special Update/Build Instructions

Current version needs makeinfo installed to build successfully.

Type

experimental

Dependencies

- mpfr: Multiple-precision floating-point computations with correct rounding
- zlib: Data compression library
- ncurses: Classic terminal output library
- $(PYTHON)
- xz: General-purpose data compression software

Version Information

package-version.txt:

8.2

Equivalent System Packages

conda:

homebrew:

$ brew install gdb

macports: install the following packages: gdb

opensuse:

$ sudo zypper install gdb

void:

$ sudo xbps-install gdb
See https://repology.org/project/gdb/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.111 gengetopt: getopt_long parser generator

Description

GNU Gengetopt converts a textual description of your program’s arguments and options into a getopt_long() parser in C (or C++).

Website: https://www.gnu.org/software/gengetopt/

License

GPL-3+ (https://www.gnu.org/software/gengetopt/LICENSE)

Type

standard

Dependencies

• xz: General-purpose data compression software

Version Information

package-version.txt:

2.23

Equivalent System Packages

conda:

$ conda install gengetopt

cygwin:

$ apt-cyg install gengetopt

Debian/Ubuntu:

$ sudo apt-get install gengetopt

Fedora/Redhat/CentOS:

$ sudo yum install gengetopt

gentoo:
$ sudo emerge dev-util/gengetopt

homebrew:

$ brew install gengetopt

nix:

$ nix-env --install gengetopt

void:

$ sudo xbps-install gengetopt

See https://repology.org/project/gengetopt/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.112 gf2x: Fast arithmetic in GF(2)[x] and searching for irreducible/primitive trinomials

Description

gf2x is a C/C++ software package containing routines for fast arithmetic in GF(2)[x] (multiplication, squaring, GCD) and searching for irreducible/primitive trinomials.

Website: https://gitlab.inria.fr/gf2x/gf2x

License

• GNU GPLv2+.

Upstream Contact

• Richard Brent
• Pierrick Gaudry
• Emmanuel Thomé
• Paul Zimmermann

Special Update/Build Instructions

• As some patches touch config/acinclude.m4, we have to touch aclocal.m4, configure, Makefile.in and gf2x/gf2x-config.h.in to prevent autotools to try to regenerate these files.
Patches

- 0001-Trac-15014-Let-gf2x-build-a-shared-library-on-Cygwin.patch: pass -no-undefined flag to libtool.
- 0002-tr-portability.patch: backport upstream fix for non-portable tr use
- 0003-Improve-detection-of-sse2-support.patch: backport upstream improved check for sse2
- 0004-Add-disable-hardware-specific-code.patch: add option -disable-hardware-specific-code to build system. This is partly backported from upstream.
- 0005-Update-autotooled-files.patch: the above patches make changes to code used by autotools for generation of the build system. This patches those files, so that autotools need not be installed.
- 0006-Fix_make_check_not_failing_on_errors.patch: (upstream patch) Fix bug in shell script such that ‘make check’ always fails upon errors.

Type

standard

Dependencies

Version Information

package-version.txt:

1.3.0

Equivalent System Packages

arch:

$ sudo pacman -S gf2x

conda:

$ conda install gf2x

Debian/Ubuntu:

$ sudo apt-get install libgf2x-dev

Fedora/Redhat/CentOS:

$ sudo yum install gf2x gf2x-devel

freebsd:

$ sudo pkg install math/gf2x

opensuse:

$ sudo zypper install "pkgconfig(gf2x)"
void:

```
$ sudo xbps-install gf2x-devel
```

See https://repology.org/project/gf2x/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.113 gfan: Groebner fans and tropical varieties

**Description**

Gfan is a software package for computing Groebner fans and tropical varieties.

These are polyhedral fans associated to polynomial ideals. The maximal cones of a Groebner fan are in bijection with the marked reduced Groebner bases of its defining ideal. The software computes all marked reduced Groebner bases of an ideal. Their union is a universal Groebner basis. The tropical variety of a polynomial ideal is a certain subcomplex of the Groebner fan. Gfan contains algorithms for computing this complex for general ideals and specialized algorithms for tropical curves, tropical hypersurfaces and tropical varieties of prime ideals. In addition to the above core functions the package contains many tools which are useful in the study of Groebner bases, initial ideals and tropical geometry. The full list of commands can be found in Appendix B of the manual. For ordinary Groebner basis computations Gfan is not competitive in speed compared to programs such as CoCoA, Singular and Macaulay2.

**License**

- GPL version 2 or version 3 (according to the gfan website)

**Upstream Contact**

Anders Nedergaard Jensen

https://users-math.au.dk/jensen/software/gfan/gfan.html

**Special Update/Build Instructions**

Remove the doc, homepage, and examples subdirectories, which take up most of the space.

**Type**

standard

**Dependencies**

- $({MP_LIBRARY})
- cdlib: Double description method for polyhedral representation conversion
Version Information

package-version.txt:

0.6.2.p1

Equivalent System Packages

arch:

$ sudo pacman -S gfan

conda:

$ conda install gfan

Debian/Ubuntu:

$ sudo apt-get install gfan

Fedora/Redhat/CentOS:

$ sudo yum install gfan

freebsd:

$ sudo pkg install math/gfan

genoo:

$ sudo emerge sci-mathematics/gfan

nix:

$ nix-env --install gfan

opensuse:

$ sudo zypper install gfan

void:

$ sudo xbps-install gfan

See https://repology.org/project/gfan/versions

If the system package is installed, ./configure will check whether it can be used.

4.1. Details of external packages
4.1.114 gfortran: Fortran compiler from the GNU Compiler Collection

Description

This package represents the required Fortran compiler.

Officially we support gfortran from GNU Compiler Collection (GCC). It has also been reported that using flang (from LLVM) might work.

You can pass the names of compilers to use to ./configure using the environment variables CC, CXX, and FC, for C, C++, and Fortran compilers, respectively.

For example, if your C compiler is clang, your C++ compiler is clang++, and your Fortran compiler is flang, then you would need to run:

```
$ ./configure CC=clang CXX=clang++ FC=flang
```

License

GPL version 2 or version 3

Upstream Contact

http://gcc.gnu.org/

Special Update/Build Instructions

None.

Type

standard

Dependencies

- $MP_LIBRARY
  - mpfr: Multiple-precision floating-point computations with correct rounding
  - mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
  - zlib: Data compression library
  - xz: General-purpose data compression software
Version Information

package-version.txt:

12.2.0

Equivalent System Packages

arch:

$ sudo pacman -S gcc-fortran

conda:

$ conda install fortran-compiler

cygwin:

$ apt-cyg install gcc-fortran

Debian/Ubuntu:

$ sudo apt-get install gfortran

Fedora/Redhat/CentOS:

$ sudo yum install gcc-gfortran

freebsd:

$ sudo pkg install lang/gcc9

homebrew:

$ brew install gfortran

macports: install the following packages: gcc10 +gfortran

opensuse:

$ sudo zypper install gcc-fortran

slackware:

$ sudo slackpkg install gcc-gfortran

void:

$ sudo xbps-install gcc-fortran

See https://repology.org/project/gfortran/versions

If the system package is installed, ./configure will check whether it can be used.

4.1. Details of external packages
4.1.115 giac: A general purpose computer algebra system

Description

- Giac is a general purpose Computer algebra system by Bernard Parisse. It consists of:
  - a C++ library (libgiac).
  - a command line interpreter (icas or giac).
  - the built of the FLTK-based GUI (xcas) has been disabled in the spkg-install file.
  - The english documentation will be installed in:
  - Author’s website with debian, ubuntu, macosx, windows package:
    http://www-fourier.ujf-grenoble.fr/~parisse/giac.html
  - The Freebsd port is math/giacxcas

Licence

GPLv3+

Note: except the french html documentation which is freely redistributable for non commercial only purposes. This doc has been removed in the Sage package, see spkg-src

Upstream Contact

- Source file (giac-x.y.z-t.tar.gz) in:

Dependencies

- gettext, readline
- giac will benefit of ntl, pari, mpfr, gsl, lapack but they should be already installed by sage.
- giac can also benefit of mpfi for arithmetic on intervals.
- The Documentation is pre-built, hevea or latex or ... are not needed to install the package.

Special Update/Build Instructions

- Use spkg-src to update this package
Type
standard

Dependencies

- **readline**: Command line editing library
- **libpng**: Bitmap image support
- **$(MP_LIBRARY)**
- **mpfr**: Multiple-precision floating-point computations with correct rounding
- **mpfi**: Multiple precision interval arithmetic library based on MPFR
- **ntl**: A library for doing number theory
- **gsl**: The GNU Scientific Library
- **pari**: Computer algebra system for fast computations in number theory
- **glpk**: GNU Linear Programming Kit
- **curl**: Multiprotocol data transfer library and utility
- **cliquer**: Routines for clique searching
- **ecm**: Elliptic curve method for integer factorization
- **$(findstring $(findstring, $(OPTIONAL_INSTALLED_PACKAGES))**

Version Information

package-version.txt:

```
1.9.0.15p0
```

Equivalent System Packages

arch:

```
$ sudo pacman -S libgiac giac
```

conda:

```
$ conda install giac
```

Debian/Ubuntu:

```
$ sudo apt-get install libgiac-dev xcas
```

Fedora/Redhat/CentOS:

```
$ sudo yum install giac giac-devel
```

freebsd:
4.1.116  git: Version control system

Description

Git is a fast, scalable, distributed revision control system with an unusually rich command set that provides both high-operations and full access to internals.

- man git

Upstream Contact

- Website: https://git-scm.com/

Type

optional

Dependencies

Version Information

Equivalent System Packages

arch:

$ sudo pacman -S git

conda:

$ conda install git

cygwin:
$ apt-cyg install git

Debian/Ubuntu:

$ sudo apt-get install git

Fedora/Redhat/CentOS:

$ sudo yum install git

deep know:

$ sudo pkg install devel/git

homebrew:

$ brew install git

macports: install the following packages: git

opensuse:

$ sudo zypper install git

slackware:

$ sudo slackpkg install git

void:

$ sudo xbps-install git

See https://repology.org/project/git/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.117 github_cli: Command-line interface for GitHub

Description

gh is GitHub on the command line. It brings pull requests, issues, and other GitHub concepts to the terminal next to where you are already working with git and your code.

License

MIT
Upstream Contact

https://github.com/cli/cli

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: github-cli

arch:

$ sudo pacman -S github-cli

conda:

$ conda install gh

Debian/Ubuntu:

$ sudo apt-get install gh

Fedora/Redhat/CentOS:

$ sudo yum install gh

freebsd:

$ sudo pkg install devel/gh

gentoo:

$ sudo emerge dev-util/github-cli

homebrew:

$ brew install gh

macports: install the following packages: gh

nix:

$ nix-env --install gh

opensuse:

$ sudo zypper install gh

void:
$ sudo xbps-install github-cli

See https://repology.org/project/github-cli/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.118 gitpython: GitPython is a python library used to interact with Git repositories

**Description**

GitPython is a python library used to interact with Git repositories

**License**

BSD

**Upstream Contact**

https://pypi.org/project/GitPython/

**Type**

optional

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

requirements.txt:

```
GitPython
```

**Equivalent System Packages**

(none known)
4.1.119 givaro: C++ library for arithmetic and algebraic computations

Description

Givaro is a C++ library for arithmetic and algebraic computations. Its main features are implementations of the basic arithmetic of many mathematical entities: Primes fields, Extensions Fields, Finite Fields, Finite Rings, Polynomials, Algebraic numbers, Arbitrary precision integers and rationals (C++ wrappers over gmp) It also provides data-structures and templated classes for the manipulation of basic algebraic objects, such as vectors, matrices (dense, sparse, structured), univariate polynomials (and therefore recursive multivariate).

Website: https://casys.gricad-pages.univ-grenoble-alpes.fr/givaro/
SPKG Repository: https://bitbucket.org/malb/givaro-spkg

License

- GNU GPL

Upstream Contact

- Clement Pernet

Type

standard

Dependencies

- $(MP_LIBRARY)

Version Information

package-version.txt:

4.1.1

Equivalent System Packages

conda:

$ conda install givaro

Debian/Ubuntu:

$ sudo apt-get install libgivaro-dev

Fedora/Redhat/CentOS:

$ sudo yum install givaro givaro-devel

freebsd:
$ sudo pkg install math/givaro

gentoo:

$ sudo emerge sci-libs/givaro

nix:

$ nix-env --install givaro

opensuse:

$ sudo zypper install "pkgconfig(givaro)"

void:

$ sudo xbps-install givaro-devel

See https://repology.org/project/givaro/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.120 glpk: GNU Linear Programming Kit

**Description**

The GLPK (GNU Linear Programming Kit) package is intended for solving large-scale linear programming (LP), mixed integer programming (MIP), and other related problems. It is a set of routines written in ANSI C and organized in the form of a callable library.

GLPK supports the GNU MathProg modelling language, which is a subset of the AMPL language.

The GLPK package includes the following main components:

- primal and dual simplex methods
- primal-dual interior-point method
- branch-and-cut method
- translator for GNU MathProg
- application program interface (API)
- stand-alone LP/MIP solver

**License**

The GLPK package is GPL version 3.
External Packages, Release 10.0

Upstream Contact

GLPK is currently being maintained by:

- Andrew Makhorin (mao@gnu.org, mao@mai2.rcnet.ru)

http://www.gnu.org/software/glpk/#maintainer

Special Update/Build Instructions

- configure doesn't support specifying the location of the GMP library to use; only --with-gmp[=yes] or --with-gmp=no are valid options. (So we *have to* add Sage’s include and library directories to CPPFLAGS and LDFLAGS, respectively.)

- Do we need the --disable-static? The stand-alone solver presumably runs faster when built with a static library; also other (stand-alone) programs using it would. (Instead, we should perhaps use --enable-static --enable-shared to go safe.)

Patches

- All patches below are currently used by spkg-src
  
  - src/01-zlib.patch: don't build the included zlib library.
  
  - src/02-cygwin_sharedlib.patch: Let a shared library be built on Cygwin by passing the -no-undefined flag to libtool.

The numbering reflect the order in which they have been created from glpk pristine’s sources

Type

standard

Dependencies

- $(MP_LIBRARY)
  
  - zlib: Data compression library

Version Information

package-version.txt:

5.0.p0
Equivalent System Packages

arch:

$ sudo pacman -S glpk

conda:

$ conda install glpk

cygwin:

$ apt-cyg install glpk libglpk-devel

Debian/Ubuntu:

$ sudo apt-get install glpk-utils libglpk-dev

Fedora/Redhat/CentOS:

$ sudo yum install glpk glpk-devel glpk-utils

freebsd:

$ sudo pkg install math/glpk

gentoo:

$ sudo emerge sci-mathematics/glpk

homebrew:

$ brew install glpk

macports: install the following packages: glpk

nix:

$ nix-env --install glpk

opensuse:

$ sudo zypper install glpk glpk-devel

void:

$ sudo xbps-install glpk-devel

See https://repology.org/project/glpk/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.121 glucose: A SAT solver

Description

Glucose is a SAT solver.

Citing its website:

The name of the solver is a contraction of the concept of “glue clauses”, a particular kind of clauses that glucose detects and preserves during search. Glucose is heavily based on Minisat, so please do cite Minisat also if you want to cite Glucose.

License

- nonparallel glucose: MIT
- parallel glucose-syrup: MIT modified with:

The parallel version of Glucose (all files modified since Glucose 3.0 releases, 2013) cannot be used in any competitive event (sat competitions/evaluations) without the express permission of the authors (Gilles Audemard / Laurent Simon). This is also the case for any competitive event using Glucose Parallel as an embedded SAT engine (single core or not).

Upstream Contact

Website: http://www.labri.fr/perso/lsimon/glucose/

Special Update/Build Instructions

None.

Type

optional

Dependencies

- zlib: Data compression library

Version Information

package-version.txt:

4.1
Equivalent System Packages

See https://repology.org/project/glucose/versions

However, these system packages will not be used for building Sage because spkg-config.m4 has not been written for this package; see github issue #27330

4.1.122 gmp: Library for arbitrary precision arithmetic

Description

GMP is a free library for arbitrary precision arithmetic, operating on signed integers, rational numbers, and floating-point numbers. There is no practical limit to the precision except the ones implied by the available memory in the machine GMP runs on. GMP has a rich set of functions, and the functions have a regular interface.

License

- LGPL V3

Upstream Contact

- http://gmplib.org

Type

standard

Dependencies

- xz: General-purpose data compression software

Version Information

package-version.txt:

6.2.1

Equivalent System Packages

conda:

```bash
$ conda install gmp
```

cygwin:

```bash
$ apt-cyg install libgmp-devel
```

Debian/Ubuntu:
$ sudo apt-get install libgmp-dev

Fedora/Redhat/CentOS:

$ sudo yum install gmp gmp-devel

efreebsd:

$ sudo pkg install math/gmp

genoor:

$ sudo emerge dev-libs/gmp

homebrew:

$ brew install gmp

macports: install the following packages: gmp

opensuse:

$ sudo zypper install gmp-devel

slackware:

$ sudo slackpkg install gmp

void:

$ sudo xbps-install gmp-devel gmpxx-devel

See https://repology.org/project/gmp/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.123 gmpy2: Python interface to GMP/MPIR, MPFR, and MPC

Description

GMP/MPIR, MPFR, and MPC interface to Python 2.6+ and 3.x

gmpy2 is a C-coded Python extension module that supports multiple-precision arithmetic. In addition to supporting GMP or MPIR for multiple-precision integer and rational arithmetic, gmpy2 adds support for the MPFR (correctly rounded real floating-point arithmetic) and MPC (correctly rounded complex floating-point arithmetic) libraries.
Type

standard

Dependencies

- $(PYTHON)
- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
2.1.2
```

install-requires.txt:

```
gmpy2 >=2.1.0
```

Equivalent System Packages

conda:

```
$ conda install gmpy2
```

macports: install the following packages: py-gmpy2

void:

```
$ sudo xbps-install python3-gmpy2
```

See [https://repology.org/project/python:gmpy2/versions](https://repology.org/project/python:gmpy2/versions), [https://repology.org/project/python:gmpy2-devel/versions](https://repology.org/project/python:gmpy2-devel/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.124 gnumib: Modules imported from Gnumib

This script package represents the modules imported into the Sage source tree from Gnumib.
Upstream Contact

https://www.gnu.org/software/gnulib/

Type

standard

Dependencies

Version Information

package-version.txt:

f9b39c4e337f1dc0dd07c4f3985c476fb875d799

Equivalent System Packages

(none known)

4.1.125 gp2c: A compiler for translating GP routines to C

Description

The gp2c compiler is a package for translating GP routines into the C programming language, so that they can be compiled and used with the PARI system or the GP calculator.

License

GPL version 2+

Upstream Contact

• http://pari.math.u-bordeaux.fr/

Dependencies

• PARI
• Perl
Type

optional

Dependencies

- pari: Computer algebra system for fast computations in number theory

Version Information

package-version.txt:

0.0.10.p0

Equivalent System Packages

Debian/Ubuntu:

$ sudo apt-get install pari-gp2c

freebsd:

$ sudo pkg install math/gp2c

gentoo:

$ sudo emerge sci-mathematics/gp2c

opensuse:

$ sudo zypper install gp2c

void:

$ sudo xbps-install gp2c

See https://repology.org/project/gp2c/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.126 graphs: A database of combinatorial graphs

Description

A database of graphs. Created by Emily Kirkman based on the work of Jason Grout. Since April 2012 it also contains the ISGCI graph database.

4.1. Details of external packages
Upstream Contact

- https://jasongrout.org/graph_database
- For ISGCI:
  H.N. de Ridder (hnridder@graphclasses.org)
- For Andries Brouwer’s database:
  The data is taken from Andries E. Brouwer’s website (https://www.win.tue.nl/~aeb/). Anything related to
  the data should be reported to him directly (aeb@cwi.nl)
  The code used to parse the data and create the .json file is available at https://github.com/nathanncohen/strongly_
  regular_graphs_database.

Type

standard

Dependencies

Version Information

package-version.txt:

20210214.p0

Equivalent System Packages

arch:

$ sudo pacman -S sage-data-graphs

conda:

$ conda install sagemath-db-graphs

See https://repology.org/project/sagemath-graphs/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written
for this package; see github issue #27330

4.1.127 graphviz: Graph visualization software

Description

Graphviz is open source graph visualization software. It has several main graph layout programs. They take descriptions
of graphs in a simple text language, and make diagrams in several useful formats.
License

Eclipse Public License 1.0

Upstream Contact

https://graphviz.org/about/

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: graphviz-dev
arch:

$ sudo pacman -S graphviz

conda:

$ conda install graphviz

cygwin:

$ apt-cyg install graphviz

Debian/Ubuntu:

$ sudo apt-get install graphviz

Fedora/Redhat/CentOS:

$ sudo yum install graphviz

freebsd:

$ sudo pkg install graphics/graphviz

homebrew:

$ brew install graphviz

macports: install the following packages: graphviz
nix:

$ nix-env --install graphviz

4.1. Details of external packages
External Packages, Release 10.0

opensuse:

```bash
$ sudo zypper install graphviz
```

void:

```bash
$ sudo xbps-install graphviz graphviz-devel
```

See https://repology.org/project/graphviz/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.128 gsl: The GNU Scientific Library

**Description**

The GNU Scientific Library


From the website above: The GNU Scientific Library (GSL) is a numerical library for C and C++ programmers. It is free software under the GNU General Public License.

The library provides a wide range of mathematical routines such as random number generators, special functions and least-squares fitting. There are over 1000 functions in total with an extensive test suite. If the variable SAGE_CHECK is exported to the value “yes” when building Sage, GSL’s test suite is run.

**License**

- GPL V3

**Upstream Contact**


GSL mailing lists:

- Bug-gsl <bug-gsl@gnu.org> mailing list – bug reports for the GNU Scientific Library should be sent to bug-gsl@gnu.org
- Help-gsl <help-gsl@gnu.org> users mailing list – for questions about installation, how GSL works and how it is used, or general questions concerning GSL.
- Info-gsl <info-gsl@gnu.org> mailing list – announcements of new releases are made there.

**Special Update/Build Instructions**

**Type**

- standard
Dependencies

- $(BLAS)
- pkgconf: An implementation of the pkg-config spec

Version Information

package-version.txt:

2.7.1

Equivalent System Packages

arch:

$ sudo pacman -S gsl

conda:

$ conda install gsl

cygwin:

$ apt-cyg install libgsl-devel

Debian/Ubuntu:

$ sudo apt-get install libgsl-dev

Fedora/Redhat/CentOS:

$ sudo yum install gsl gsl-devel

freebsd:

$ sudo pkg install math/gsl

gentoo:

$ sudo emerge sci-libs/gsl

homebrew:

$ brew install gsl

macports: install the following packages: gsl

nix:

$ nix-env --install gsl

opensuse:
$ sudo zypper install "pkgconfig(gsl)"

slackware:
$ sudo slackpkg install gsl

void:
$ sudo xbps-install gsl-devel

See https://repology.org/project/gsl/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.129 hatch_fancy_pypi_readme: Fancy PyPI READMEs with Hatch

Description
Fancy PyPI READMEs with Hatch

License
MIT

Upstream Contact
https://pypi.org/project/hatch-fancy-pypi-readme/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
  - hatchling: Modern, extensible Python build backend

Version Information
package-version.txt:
22.8.0

install-requires.txt:
hatch-fancy-pypi-readme
Equivalent System Packages

(none known)

4.1.130 hatch_nodejs_version: Hatch plugin for versioning from a package.json file

Description

Hatch plugin for versioning from a package.json file

License

MIT

Upstream Contact

https://pypi.org/project/hatch-nodejs-version/

Type

standard

Dependencies

- $(PYTHON)
- hatchling: Modern, extensible Python build backend
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.3.1

install-requires.txt:

hatch-nodejs-version

Equivalent System Packages

(none known)
4.1.131 hatch_vcs: Hatch plugin for versioning with your preferred VCS

**Description**

Hatch plugin for versioning with your preferred VCS

**License**

**Upstream Contact**

https://pypi.org/project/hatch-vcs/

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend

**Version Information**

package-version.txt:

```
0.2.0
```

install-requires.txt:

```
hatch-vcs
```

**Equivalent System Packages**

(none known)

4.1.132 hatchling: Modern, extensible Python build backend

**Description**

Modern, extensible Python build backend
License

MIT

Upstream Contact

https://pypi.org/project/hatchling/

Type

standard

Dependencies

- $(PYTHON)
- pathspec: Utility library for gitignore style pattern matching of file paths.
- toml: A lil’ TOML parser
- editables: Editable installations
- pluggy: plugin and hook calling mechanisms for python
- packaging: Core utilities for Python packages
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.11.1

install-requires.txt:

hatchling

Equivalent System Packages

conda:

$ conda install hatchling

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.133 html5lib: An HTML parser

Description

HTML parser based on the WHATWG HTML specification.

License

MIT License

Upstream Contact

Home Page: https://github.com/html5lib/html5lib-python/issues

Type

standard

Dependencies

- $(PYTHON)
  - webencodings: Character encoding aliases for legacy web content
  - $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.1

install-requires.txt:

html5lib >=1.0.1

Equivalent System Packages

conda:

$ conda install html5lib

macports: install the following packages: py-html5lib

void:

$ sudo xbps-install python3-html5lib


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.134 iconv: Library for language/country-dependent character encodings

Description

GNU libiconv is a library that is used to enable different languages, with different characters to be handled properly.

License

- GPL 3 and LGPL 3. So we can safely link against the library in Sage.

Upstream Contact

- http://www.gnu.org/software/libiconv/
- Bug reports to bug-gnu-libiconv@gnu.org

Special Update/Build Instructions

- None, other than anyone updating this package should be familiar with how to write shell scripts.

Type

standard

Dependencies

Version Information

package-version.txt:

1.15

Equivalent System Packages

cygwin:

$ apt-cyg install libiconv-devel

homebrew:

$ brew install libiconv

macports: install the following packages: libiconv
See https://repology.org/project/libiconv/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.135 idna: Internationalized Domain Names in Applications (IDNA)

**Description**

Internationalized Domain Names in Applications (IDNA)

**License**

BSD-3-Clause

**Upstream Contact**

https://pypi.org/project/idna/

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

3.4

install-requires.txt:

idna

**Equivalent System Packages**

conda:

$ conda install idna

void:

$ sudo xbps-install python3-idna

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.136 igraph: A library for creating and manipulating graphs

Description

igraph is a library for creating and manipulating graphs. It is intended to be as powerful (ie. fast) as possible to enable the analysis of large graphs.

License

GPL version 2

Upstream Contact

http://igraph.org/c/

Dependencies

igraph can optionally use libxml2 for providing a GraphML importer.

Special Update/Build Instructions

Type

optional

Dependencies

- $(MP_LIBRARY)
- glpk: GNU Linear Programming Kit
- $(BLAS)
- cmake: A cross-platform build system generator

Version Information

package-version.txt:

```
0.10.2
```
Equivalent System Packages

arch:

$ sudo pacman -S igraph

conda:

$ conda install igraph

Debian/Ubuntu:

$ sudo apt-get install libigraph-dev

Fedora/Redhat/CentOS:

$ sudo yum install igraph igraph-devel

gentoo:

$ sudo emerge dev-libs/igraph

freebsd:

$ sudo pkg install math/igraph

homebrew:

$ brew install igraph

macports: install the following packages: igraph

void:

$ sudo xbps-install igraph-devel

See https://repology.org/project/igraph/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.137 ImageMagick: A collection of tools and libraries for many image file formats

Description

A collection of tools and libraries for many image file formats
License

Copyright [yyyy] [name of copyright owner]

Licensed under the ImageMagick License (the “License”); you may not use this file except in compliance with the License. You may obtain a copy of the License at

https://imagemagick.org/script/license.php

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an “AS IS” BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Upstream Contact

http://www.imagemagick.org/

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: imagemagick
arch:

$ sudo pacman -S imagemagick

conda:

$ conda install imagemagick

cygwin:

$ apt-cyg install ImageMagick

Debian/Ubuntu:

$ sudo apt-get install imagemagick

Fedora/Redhat/CentOS:

$ sudo yum install ImageMagick

freebsd:

$ sudo pkg install graphics/ImageMagick7

homebrew:
$ brew install imagemagick

macports: install the following packages: ImageMagick

nix:

$ nix-env --install imagemagick

opensuse:

$ sudo zypper install ImageMagick

void:

$ sudo xbps-install ImageMagick

See https://repology.org/project/imagemagick/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.138 imagesize: Parser for image file metadata

**Description**

It parses image files’ header and return image size.

**Type**

standard

**Dependencies**

- \$(PYTHON)
- \$(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```plaintext
1.4.1
```

install-requires.txt:

```plaintext
imagesize >=1.1.0
```

---

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**Equivalent System Packages**

conda:

```
$ conda install imagesize
```

macports: install the following packages: py-imagesize

void:

```
$ sudo xbps-install python3-imagesize
```

See [https://repology.org/project/python:imagesize/versions](https://repology.org/project/python:imagesize/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.139 iml: Integer Matrix Library

**Description**

IML is a free library of C source code which implements algorithms for computing exact solutions to dense systems of linear equations over the integers. IML is designed to be used with the ATLAS/BLAS library and GMP bignum library.

Written in portable C, IML can be used on both 32-bit and 64-bit machines. It can be called from C++.

Website: [https://www.cs.uwaterloo.ca/~astorjoh/iml.html](https://www.cs.uwaterloo.ca/~astorjoh/iml.html)

**License**

- GPLv2+

**Upstream Contact**

- Zhuliang Chen `z4chen@uwaterloo.ca`
- Arne Storjohann `astorjoh@uwaterloo.ca`

**Special Update/Build Instructions**

- As of version 1.0.4, you need to repackage the upstream tarball using the spkg-src script because there was a bugfix version of 1.0.4 reposted upstream without version number bump.
Patches

- examples.patch: Modified some of the examples.

Type

standard

Dependencies

- $(MP_LIBRARY)
- $(BLAS)
- pkgconf: An implementation of the pkg-config spec

Version Information

package-version.txt:

1.0.4p2.p2

Equivalent System Packages

arch:

$ sudo pacman -S iml

conda:

$ conda install iml

Debian/Ubuntu:

$ sudo apt-get install libiml-dev

Fedora/Redhat/CentOS:

$ sudo yum install iml iml-devel

freebsd:

$ sudo pkg install math/iml

gentoo:

$ sudo emerge sci-libs/iml

nix:

$ nix-env --install iml

opensuse:
$ sudo zypper install iml-devel

void:

$ sudo xbps-install  iml-devel

See https://repology.org/project/iml/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.140 importlib_metadata: Library to access the metadata for a Python package

Description
This is a backport package, supplying access to the functionality of `importlib.metadata` including improvements added to subsequent Python versions.

License
Apache Software License

Upstream Contact

- https://pypi.org/project/importlib-metadata/
- http://importlib-metadata.readthedocs.io/

Type
standard

Dependencies

- $(PYTHON)
- zipp: A pathlib-compatible zipfile object wrapper
- typing_extensions: Backported and Experimental Type Hints for Python 3.5+
- $(PYTHON_TOOLCHAIN)
- tomli: A lil’ TOML parser
Version Information

package-version.txt:

6.0.0

install-requires.txt:

# According to https://pypi.org/project/importlib-metadata/,
# 4.13 provides the features of Python 3.11 importlib.metadata
importlib_metadata >=4.13

Equivalent System Packages

conda:

$ conda install importlib_metadata

void:

$ sudo xbps-install python3-importlib_metadata

See https://repology.org/project/python:importlib-metadata/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.141 importlib_resources: Read resources from Python packages

Description

Read resources from Python packages

License

Apache2

Upstream Contact

https://pypi.org/project/importlib-resources/

Type

standard
Dependencies

- $(PYTHON)
- zipp: A pathlib-compatible zipfile object wrapper
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
5.12.0
```

install-requires.txt:

```
# According to https://pypi.org/project/importlib-resources/,
# version 5.7 provides the features of Python 3.11 importlib.resources
importlib_resources >= 5.7
```

Equivalent System Packages

conda:

```
$ conda install importlib-resources
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.142 info: stand-alone Info documentation reader

Description

GNU Info is the stand-alone “info” reader that is part of the GNU Texinfo suite of tools. Several packages (Maxima, Singular, …) install documentation in “info” format, which can be read either with Emacs, the stand-alone “info” reader, and some other software. In particular, the interactive help system of `singular_console()` uses the info program in environments in which a web browser is not available; if info is not installed, it falls back to a basic pager with limited capabilities.

Website: https://www.gnu.org/software/texinfo/manual/info-stnd/info-stnd.html

License

GPL-3+ (info/*.c comments in the source repository)
**Type**

optional

**Dependencies**

- ncurses: Classic terminal output library
- xz: General-purpose data compression software

**Version Information**

package-version.txt:
```
6.8
```

**Equivalent System Packages**

conda:
```
$ conda install texinfo
```

cygwin:
```
$ apt-cyg install info
```

Debian/Ubuntu:
```
$ sudo apt-get install texinfo
```

Fedora/Redhat/CentOS:
```
$ sudo yum install texinfo
```

genoot:
```
$ sudo emerge sys-apps/texinfo
```

homebrew:
```
$ brew install texinfo
```

macports: install the following packages: texinfo

nix:
```
$ nix-env --install texinfo
```

opensuse:
```
$ sudo zypper install texinfo
```

void:
$ sudo xbps-install texinfo

See https://repology.org/project/texinfo/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.143 ipykernel: IPython Kernel for Jupyter

Description

This package provides the IPython kernel for Jupyter.

Type

standard

Dependencies

- $(PYTHON)
- ipython_genutils: Vestigial utilities from IPython
- importlib_metadata: Library to access the metadata for a Python package
- matplotlib_inline: Inline Matplotlib backend for Jupyter
- ipython: Interactive computing environment with an enhanced interactive Python shell
- jupyter_client: Jupyter protocol implementation and client libraries
- tornado: Python web framework and asynchronous networking library
- appnope: Disable App Nap on macOS >= 10.9
- traits: Traits Python configuration system
- executing: Get the currently executing AST node of a frame, and other information
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

6.6.0

install-requires.txt:

ipykernel >=5.2.1
**Equivalent System Packages**

conda:

```
$ conda install ipykernel
```

macports: install the following packages: py-ipykernel

void:

```
$ sudo xbps-install python3-ipython_ipykernel
```

See [https://repology.org/project/python:ipykernel/versions](https://repology.org/project/python:ipykernel/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sage/sage/issue-29023)

### 4.1.144 ipympl: Matplotlib Jupyter Extension

**Description**

Matplotlib Jupyter Extension

**License**

BSD License

**Upstream Contact**

[https://pypi.org/project/ipympl/](https://pypi.org/project/ipympl/)

**Type**

optional

**Dependencies**

- `$(PYTHON)`
- `ipywidgets`: *Interactive HTML widgets for Jupyter notebooks and the IPython kernel*
- `matplotlib`: *Python 2D plotting library*
- `ipykernel`: *IPython Kernel for Jupyter*
- `$(PYTHON_TOOLCHAIN)`
- `jupyter_packaging`: *Jupyter Packaging Utilities*
Version Information

requirements.txt:

ipympl

install-requires.txt:

ipympl

Equivalent System Packages

conda:

$ conda install ipympl

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.145 ipython: Interactive computing environment with an enhanced interactive Python shell

Description

Interactive computing environment with an enhanced interactive Python shell

From the IPython website:

IPython is a multiplatform, Free Software project (BSD licensed) that offers:

- An enhanced Python shell designed for efficient interactive work. It includes many enhancements over the default Python shell, including the ability for controlling interactively all major GUI toolkits in a non-blocking manner.
- A library to build customized interactive environments using Python as the basic language (but with the possibility of having extended or alternate syntaxes).
- A system for interactive distributed and parallel computing (this is part of IPython’s new development).

License

BSD

Upstream Contact

http://ipython.org
ipython-dev@scipy.org
ipython-user@scipy.org
External Packages, Release 10.0

Type
standard

Dependencies

- $(PYTHON)
- jinja2: General purpose template engine for Python
- tornado: Python web framework and asynchronous networking library
- pyzmq: Python bindings for the zeromq networking library
- pickleshare: A ‘shelf’ like datastore with concurrency support
- simplegeneric: Simple single-dispatch generic functions for Python
- traitlets: Traitlets Python configuration system
- decorator: Python library providing decorators
- wcwidth: Measures the displayed width of unicode strings in a terminal
- prompt_toolkit: Interactive command lines for Python
- pygments: Generic syntax highlighter
- pexpect: Python module for controlling and automating other programs
- appnope: Disable App Nap on macOS &gt;= 10.9
- backcall: Specifications for callback functions
- jedi: Static analysis tool providing IDE support for Python
- stack_data: Extract data from python stack frames and tracebacks for informative displays
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

8.6.0

install-requires.txt:

ipython &gt;=7.13.0

Equivalent System Packages

conda:

$ conda install ipython

homebrew:

$ brew install ipython
macports: install the following packages: py-ipython

opensuse:

$ sudo zypper install python3-ipython

void:

$ sudo xbps-install python3-ipython

See https://repology.org/project/ipython/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.146 ipython_genutils: Vestigial utilities from IPython

Description

Vestigial utilities from IPython

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.2.0

install-requires.txt:

ipython_genutils >=0.2.0

Equivalent System Packages

conda:

$ conda install ipython_genutils

macports: install the following packages: py-ipython_genutils

void:

$ sudo xbps-install python3-ipython_genutils

4.1. Details of external packages 199
External Packages, Release 10.0

See https://repology.org/project/python:ipython-genutils/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.147 ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

Description

Interactive HTML widgets for Jupyter notebooks and the IPython kernel.

Type

standard

Dependencies

- $(PYTHON)
- widgetsnbextension: Jupyter notebook extension for interactive HTML widgets
- jupyterlab_widgets: Jupyter interactive widgets for JupyterLab
- $(PYTHON_TOOLCHAIN)
- ipykernel: IPython Kernel for Jupyter
- ipython: Interactive computing environment with an enhanced interactive Python shell
- traitlets: Traitlets Python configuration system

Version Information

package-version.txt:

8.0.2

install-requires.txt:

ipywidgets >=7.5.1

Equivalent System Packages

conda:

$ conda install ipywidgets<8.0.0

macports: install the following packages: py-ipywidgets
void:

$ sudo xbps-install python3-jupyter_ipywidgets
See https://repology.org/project/python:ipywidgets/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.148 isl: Sets and relations of integer points bounded by affine constraints**

**Description**

isl is a thread-safe C library for manipulating sets and relations of integer points bounded by affine constraints. The descriptions of the sets and relations may involve both parameters and existentially quantified variables. All computations are performed in exact integer arithmetic using GMP.

**License**

isl is released under the MIT license, but depends on the LGPL GMP library.

**Upstream Contact**

- [http://groups.google.com/group/isl-development](http://groups.google.com/group/isl-development)

**Citation**

```latex
@incollection{Verdoolaege2010isl,
    author = {Verdoolaege, Sven},
    title = {isl: An Integer Set Library for the Polyhedral Model},
    booktitle = {Mathematical Software - ICMS 2010},
    series = {Lecture Notes in Computer Science},
    editor = {Fukuda, Komei and Hoeven, Joris and Joswig, Michael and Takayama, Nobuki},
    publisher = {Springer},
    isbn = {978-3-642-15581-9},
    pages = {299-302},
    volume = {6327},
    year = {2010}
}
```

**Type**

optional
Dependencies

- $(MP_LIBRARY)

Version Information

package-version.txt:

0.20

Equivalent System Packages

conda:

$ conda install isl

cygwin:

$ apt-cyg install libisl-devel

Debian/Ubuntu:

$ sudo apt-get install libisl-dev

Fedora/Redhat/CentOS:

$ sudo yum install isl-devel

freebsd:

$ sudo pkg install devel/isl

gentoo:

$ sudo emerge dev-libs/isl

homebrew:

$ brew install isl

macports: install the following packages: isl

opensuse:

$ sudo zypper install "pkgconfig(isl)"

void:

$ sudo xbps-install isl-devel

See https://repology.org/project/isl/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.149 jedi: Static analysis tool providing IDE support for Python

Description

Jedi is a static analysis tool for Python that is typically used in IDEs/editors plugins. Jedi has a focus on autocompletion and goto functionality. Other features include refactoring, code search and finding references.

Type

standard

 Dependencies

- $(PYTHON)
- parso: A Python parser
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

| 0.18.1 |

install-requires.txt:

| jedi >=0.17.0 |

Equivalent System Packages

conda:

$ conda install jedi

macports: install the following packages: py-jedi

void:

$ sudo xbps-install python3-jedi

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.150 jinja2: General purpose template engine for Python

Description

Jinja2 is a library for Python 2.4 and onwards that is designed to be flexible, fast and secure.
If you have any exposure to other text-based template languages, such as Smarty or Django, you should feel right at home with Jinja2. It's both designer and developer friendly by sticking to Python’s principles and adding functionality useful for templating environments.

License

Modified BSD License

Upstream Contact

Author: Pocoo Team <http://pocoo.org>
Homepage: http://jinja.pocoo.org/

Special Update/Build Instructions

None. (Just make sure its prerequisites are new enough in Sage, to avoid downloads during the build / installation.)

Type

standard

Dependencies

- $(PYTHON)
- markupsafe: Safely add untrusted strings to HTML/XML markup
- docutils: Processing plaintext documentation into useful formats, such as HTML or LaTeX
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.1.2

install-requires.txt:

jinja2 >=2.11.2
### Equivalent System Packages

conda:

```
$ conda install jinja2
```

macports: install the following packages: py-jinja2

opensuse:

```
$ sudo zypper install python3-Jinja2
```

void:

```
$ sudo xbps-install python3-Jinja2
```

See [https://repology.org/project/python:jinja2/versions](https://repology.org/project/python:jinja2/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

#### 4.1.151 jmol: Java viewer for chemical structures in 3D

**Description**

Java viewer for chemical structures in 3D.
This provides files necessary for Jmol (java).
This package does not install JSmol (javascript), which upstream bundles with Jmol.

**License**

GPLv2+

**Upstream Contact**

- [http://jmol.sourceforge.net](http://jmol.sourceforge.net)
- Bob Hanson
- e-mail: hansonr@stolaf.edu
- Homepage: [https://www.stolaf.edu/people/hansonr/](https://www.stolaf.edu/people/hansonr/)
- Development page: [https://github.com/BobHanson/Jmol-SwingJS](https://github.com/BobHanson/Jmol-SwingJS)
Dependencies

No build-time dependencies.
The commandline jmol requires java at runtime.

Special Build Instructions

To avoid depending on unzip at build time, we have to repack the tarball, see spkg-src. We take the opportunity to remove some unnecessary subdirectories, see http://wiki.jmol.org/index.php/Jmol_JavaScript_Object#In_detail

Type

standard

Dependencies

Version Information

package-version.txt:

14.29.52

Equivalent System Packages

arch:

$ sudo pacman -S jmol

conda:

$ conda install jmol

macports: install the following packages: jmol

nix:

$ nix-env --install jmol

opensuse:

$ sudo zypper install jmol

void:

$ sudo xbps-install jmol

See https://repology.org/project/jmol/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.152 jsonschema: Python implementation of JSON Schema

Description

jsonschema is an implementation of JSON Schema for Python

License

MIT License

Upstream Contact

Home page: http://github.com/Julian/jsonschema

Type

standard

Dependencies

- $(PYTHON)
- vcversioner: Python build system extension to obtain package version from version control
- attrs: Decorator for Python classes with attributes
- importlib_metadata: Library to access the metadata for a Python package
- pyrsistent: Persistent data structures in Python
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend
- hatch_vcs: Hatch plugin for versioning with your preferred VCS
- hatch_fancy_pypi_readme: Fancy PyPI READMEs with Hatch

Version Information

package-version.txt:

4.17.1

install-requires.txt:

jsonschema >=3.2.0
**Equivalent System Packages**

conda:

$$\texttt{conda install jsonschema}$$

macports: install the following packages: py-jsonschema

opensuse:

$$\texttt{sudo zypper install python3-jsonschema}$$

void:

$$\texttt{sudo xbps-install python3-jsonschema}$$

See [https://repology.org/project/python:jsonschema/versions](https://repology.org/project/python:jsonschema/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/polymake/JuPyMake/issues/29023)

### 4.1.153 jupymake: A Python wrapper for the polymake shell

**Description**

The Python module JuPyMake provides an interface to polymake.

**License**

- GPL v2

**Upstream Contact**

[https://github.com/polymake/JuPyMake](https://github.com/polymake/JuPyMake)

**Special Update/Build Instructions**

**Type**

optional

**Dependencies**

- $$\texttt{\$(PYTHON)}$$
- **polymake**: *Computations with polyhedra, fans, simplicial complexes, matroids, graphs, tropical hypersurfaces*
- $$\texttt{\$(PYTHON\_TOOLCHAIN)}$$
Version Information

package-version.txt:

0.9

install-requires.txt:

jupymake >=0.9

Equivalent System Packages


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.154 jupyter_client: Jupyter protocol implementation and client libraries

Description

jupyter_client contains the reference implementation of the Jupyter protocol. It also provides client and kernel management APIs for working with kernels.

It also provides the jupyter kernelspec entrypoint for installing kernelspecs for use with Jupyter frontends.

Type

standard

Dependencies

- $(PYTHON)
- jupyter_core: Jupyter core package
- $(PYTHON_TOOLCHAIN)
- pyzmq: Python bindings for the zeromq networking library
- dateutil: Extensions to the standard Python module datetime
- nest_asyncio: Patch asyncio to allow nested event loops
- tornado: Python web framework and asynchronous networking library
- traits: Traits Python configuration system
- entrypoints: Discover and load entry points from installed Python packages
- hatchling: Modern, extensible Python build backend
Version Information

package-version.txt:

7.4.4

install-requires.txt:

jupyter_client >=6.1.6

Equivalent System Packages

conda:

$ conda install jupyter_client

macports: install the following packages: py-jupyter_client

opensuse:

$ sudo zypper install python3-jupyter-client

void:

$ sudo xbps-install python3-jupyter_client


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.155 jupyter_core: Jupyter core package

Description

Jupyter core package. A base package on which Jupyter projects rely.

Type

standard

Dependencies

- ${PYTHON}
- ${PYTHON_TOOLCHAIN}
- traitlets: Traitlets Python configuration system
**Version Information**

package-version.txt:

4.11.2

install-requires.txt:

jupyter_core >=4.6.3

**Equivalent System Packages**

conda:

```bash
$ conda install jupyter_core
```

macports: install the following packages: py-jupyter_core

```bash
$ sudo zypper install python3-jupyter-core
```

opensuse:

```bash
$ sudo zypper install python3-jupyter-core
```

void:

```bash
$ sudo xbps-install python3-jupyter-core
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

**4.1.156 jupyter_jsmol: JSmol viewer widget for Jupyter**

**Description**

JSmol viewer widget for Jupyter

**License**

BSD

**Upstream Contact**

https://pypi.org/project/jupyter-jsmol/
Type

standard

Dependencies

- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
- jupyter_packaging: Jupyter Packaging Utilities
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.1.0

install-requires.txt:

jupyter-jmol >=2022.1.0

Equivalent System Packages

conda:

$ conda install jupyter-jmol


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.157 jupyter_packaging: Jupyter Packaging Utilities

Description

Jupyter Packaging Utilities

License

BSD
Upstream Contact

https://pypi.org/project/jupyter-packaging/

Type

standard

Dependencies

- $(PYTHON)
- packaging: Core utilities for Python packages
- deprecation: A library to handle automated deprecations
- tomlkit: Style preserving TOML library
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend

Version Information

package-version.txt:

0.12.3

install-requires.txt:

jupyter-packaging

Equivalent System Packages

conda:

$ conda install jupyter-packaging

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.158 jupyter_sphinx: Jupyter Sphinx Extension

Description

Jupyter Sphinx Extension
License

BSD

Upstream Contact

https://pypi.org/project/jupyter-sphinx/

Type

standard

Dependencies

- $(PYTHON)
- sphinx: Python documentation generator
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
- ipython: Interactive computing environment with an enhanced interactive Python shell
- nbconvert: Converting Jupyter Notebooks
- nbformat: Base implementation of the Jupyter notebook format
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.3.2

install-requires.txt:

jupyter-sphinx

Equivalent System Packages

conda:

$ conda install jupyter_sphinx

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.159 jupyterlab: An extensible environment for interactive and reproducible computing

Description

An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.

License

BSD License

Upstream Contact

Home page: https://jupyter.org/

Type

optional

Dependencies

- $(PYTHON)
- vcversioner: Python build system extension to obtain package version from version control
- jupyter_core: Jupyter core package
- jupyter_client: Jupyter protocol implementation and client libraries
- jinja2: General purpose template engine for Python
- tornado: Python web framework and asynchronous networking library
- ipython: Interactive computing environment with an enhanced interactive Python shell
- packaging: Core utilities for Python packages
- terminado: Tornado websocket backend for the term.js Javascript terminal emulator library
- traitlets: Traitlets Python configuration system
- nbconvert: Converting Jupyter Notebooks
- send2trash: Send file to trash natively under Mac OS X, Windows and Linux
- nbformat: Base implementation of the Jupyter notebook format
- prometheus_client: Python client for the systems monitoring and alerting toolkit Prometheus
- ipython_genutils: Vestigial utilities from IPython
- argon2_cffi: The secure Argon2 password hashing algorithm
- pyzmq: Python bindings for the zeromq networking library
- idna: Internationalized Domain Names in Applications (IDNA)
- requests: An HTTP library for Python
- jsonschema: Python implementation of JSON Schema
• `babel`: Internationalization utilities for Python
• `notebook`: Jupyter notebook, a web-based notebook environment for interactive computing
• `$(PYTHON_TOOLCHAIN)`

**Version Information**

requirements.txt:

```bash
jupyterlab ~= 3.3
# See :issue:`33607`
jupyterlab-server < 2.11
```

**Equivalent System Packages**

conda:

```bash
$ conda install jupyterlab
```

homebrew:

```bash
$ brew install jupyterlab
```

macports: install the following packages: py-jupyterlab

void:

```bash
$ sudo xbps-install jupyterlab
```


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.160 `jupyterlab_pygments`: Pygments theme using JupyterLab CSS variables

**Description**

Pygments theme using JupyterLab CSS variables

**License**

BSD
Upstream Contact

https://pypi.org/project/jupyterlab-pygments/

Type

standard

Dependencies

- $(PYTHON)
- `pygments`: Generic syntax highlighter
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.1.2

install-requires.txt:

jupyterlab-pygments

Equivalent System Packages

conda:

```
$ conda install jupyterlab_pygments
```

void:

```
$ sudo xbps-install python3-jupyterlab_pygments
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.161 jupyterlab_widgets: Jupyter interactive widgets for JupyterLab

Description

Jupyter interactive widgets for JupyterLab
License

BSD-3-Clause

Upstream Contact

https://pypi.org/project/jupyterlab-widgets/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.0.3

install-requires.txt:

jupyterlab-widgets

Equivalent System Packages

macports: install the following packages: py-jupyterlab_widgets

See [https://repology.org/project/jupyterlab-widgets/versions](https://repology.org/project/jupyterlab-widgets/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

4.1.162 kenzo: Construct topological spaces and compute homology groups

Description

Kenzo is a package to compute properties (mainly homology groups) of topological spaces. It allows defining spaces created from others by constuctions like loop spaces, classifying spaces and so on.
License
GPL

Upstream Contact

- https://github.com/gheber/kenzo
- https://github.com/miguelmarco/kenzo/

Type
optional

Dependencies

- ecl: An implementation of the Common Lisp language

Version Information

package-version.txt:

1.1.10

Equivalent System Packages

See https://repology.org/project/kenzo/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.163 kissat: SAT solver

Description

From the package README:

KISSAT is a "keep it simple and clean bare metal SAT solver" written in C. It is a port of CaDiCaL back to C with improved data structures, better scheduling of inprocessing and optimized algorithms and implementation.

Coincidentally 'kissat' also means 'cats' in Finnish.

From the website:

The Kissat SAT solver is a condensed and improved reimplementation of CaDiCaL in C.

Kissat won first place in the main track of the SAT Competition 2020 and first place on unsatisfiable instances.
License
MIT license.

Upstream Contact
Website: http://fmv.jku.at/kissat/

Type
optional

Dependencies

Version Information
package-version.txt:

3.0.0

Equivalent System Packages
Fedora/Redhat/CentOS:

$ sudo yum install kissat

Gentoo:

$ sudo emerge sci-mathematics/kissat

Nix:

$ nix-env --install kissat

See https://repology.org/project/kissat/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.164 kiwisolver: An implementation of the Cassowary constraint solving algorithm

Description
From https://pypi.org/project/kiwisolver/
A fast implementation of the Cassowary constraint solver
Kiwi is an efficient C++ implementation of the Cassowary constraint solving algorithm. Kiwi is an implementation of the algorithm based on the seminal Cassowary paper. It is not a refactoring of the original C++ solver. Kiwi has been designed from the ground up to be lightweight and fast. Kiwi ranges from 10x to 500x faster than the original Cassowary solver with typical use cases gaining a 40x improvement. Memory savings are consistently > 5x.
In addition to the C++ solver, Kiwi ships with hand-rolled Python bindings.

License

Modified BSD License

Upstream Contact

https://github.com/nucleic/kiwi

Type

standard

Dependencies

- $(PYTHON)
- cppy: C++ headers for C extension development
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.4.3

install-requires.txt:

kiwisolver >=1.0.1

Equivalent System Packages

conda:

$ conda install kiwisolver

macports: install the following packages: py-kiwisolver

void:

$ sudo xbps-install python3-kiwisolver

See https://repology.org/project/python:kiwisolver/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.165 latte_int: Count lattice points, compute volumes, and integrate over convex polytopes

Description

LattE (Lattice point Enumeration) Integrale solves the problems of counting lattice points in and integration over convex polytopes.

License

GPLv2

Upstream Contact

Matthias Köppe, UC Davis, CA, USA

Type

optional

Dependencies

- $(MP_LIBRARY)
- ntl: A library for doing number theory
- 4ti2: Algebraic, geometric and combinatorial problems on linear spaces
- cddlib: Double description method for polyhedral representation conversion
- lidia: A library for computational number theory

Version Information

package-version.txt:

1.7.6

Equivalent System Packages

arch:

$ sudo pacman -S latte-integrale

conda:

$ conda install latte-integrale

opensuse:

$ sudo zypper install latte
See https://repology.org/project/latte-integrale/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.166  lcalc: L-function calculator

**Description**

Michael Rubinstein’s L-function calculator.

**License**

- LGPL V2+

**Upstream contact**

Michael Rubinstein <mrubinst@uwaterloo.ca>

Sources: [http://oto.math.uwaterloo.ca/~mrubinst/L_function_public/L.html](http://oto.math.uwaterloo.ca/~mrubinst/L_function_public/L.html)


**Dependencies**

- GMP/MPIR
- MPFR
- PARI
- GNU patch

**Special Update/Build Instructions**

- There is some garbage in the upstream sources which should be removed:

  ```
  src/include/._ExplicitFormula.h.swp
  src/include/._Lvalue.h.swp
  src/include/._DS_Store
  src/include/LExplicitFormula.h.swap.crap
  src/include/Lvalue.h.bak
  src/src/Makefile.old
  src/src/._Makefile.old.swp
  src/src/._DS_Store
  src/src/Lcommandline.ggo.swp
  src/src/libLfunction.a
  ```

- We (and apparently also upstream) currently don’t build Lcalc’s tests (see Makefile), hence there’s no spkg-check. This might change in newer upstream versions.
The original Makefile uses $(CC) to compile C++ (also using $(CCFLAGS)), which it defines to ‘g++’, and hardcodes ‘g++’ when linking the shared library. (It should use $(CXX) instead, which might *default* to ‘g++’.) We now (lcalc-1.23.p10) patch the Makefile also to use $(CXX) for compiling and linking C++; $(CXX) now *defaults* to ‘g++’, and $(CC) to ‘gcc’, but both can be overridden by simply setting their respective environment variables. (Same for $(INSTALL_DIR) btw.)

### Patches

- **Makefile.patch:**

  We change a lot there, since Lcalc doesn’t have a ‘configure’ script, and hence the Makefile is supposed to be edited to customize Lcalc (build options, locations of headers and libraries etc.). Besides that, we
  - put CXXFLAGS into Lcalc’s “CCFLAGS” used for compiling C++,
  - remove some stuff involving LDFLAGS1 and LDFLAGS2, setting just LDFLAGS,
  - use $(MAKE) instead of ‘make’ in the crude build receipts,
  - use CXXFLAG64 when linking the shared library,
  - now use $(CXX) for compiling and linking C++, which *defaults* to ‘g++’, but can be overridden by setting the environment variable of the same name. ($(CC) now *defaults* to ‘gcc’, although currently not really used as far as I can see.)
  - $(INSTALL_DIR) can now be overridden by simply setting the environment variable of the same name.

- **Lcommon.h.patch:**

  Uncomment the definition of lcalc_to_double(const long double& x). (Necessary for GCC >= 4.6.0, cf. #10892.) Comment from there: The reason is the following code horror from src/src/include/Lcommon.h: […] But somebody who is familiar with the codebase should really rewrite lcalc to not redefine the double() cast, thats just fragile and will sooner or later again fail inside some system headers.

- **pari-2.7.patch:**

  Various changes to port to newer versions of PARI.

- **time.h.patch:**

  (Patches src/include/Lcommandline_numbertheory.h) Include also <time.h> in Lcommandline_numbertheory.h (at least required on Cygwin, cf. #9845). This should get reported upstream.

- **lcalc-1.23_default_parameters_1.patch:** Make Lcalc (1.23) build with GCC 4.9

### Type

Standard

### Dependencies

- **pari:** Computer algebra system for fast computations in number theory
- **gengetopt:** getopt_long parser generator
Version Information

package-version.txt:

2.0.5

Equivalent System Packages

arch:

$ sudo pacman -S lcalc

conda:

$ conda install lcalc

Debian/Ubuntu:

$ sudo apt-get install lcalc liblfunction-dev

Fedora/Redhat/CentOS:

$ sudo yum install L-function-devel L-function

freebsd:

$ sudo pkg install math/lcalc

gentoo:

$ sudo emerge sci-mathematics/lcalc

nix:

$ nix-env --install lcalc

void:

$ sudo xbps-install lcalc-devel

See https://repology.org/project/lcalc/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.167 libatomic_ops: Access hardware-provided atomic memory update operations

Description

A part of the Boehm-Demers-Weiser conservative garbage collector.
License

- Permissive BSD + GPL 2.0+

Upstream Contact

- Webpage: http://www.hboehm.info/gc/
- Email List: bdwgc@lists.opendylan.org

Special Update/Build Instructions

None.

Type

standard

Dependencies

Version Information

package-version.txt:

7.6.10

Equivalent System Packages

arch:

```bash
$ sudo pacman -S libatomic_ops
```

conda:

```bash
$ conda install libatomic_ops
```

cygwin:

```bash
$ apt-cyg install libatomic_ops-devel
```

Debian/Ubuntu:

```bash
$ sudo apt-get install libatomic-ops-dev
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install libatomic_ops libatomic_ops-devel
```

freebsd:

```bash
$ sudo pkg install devel/libatomic_ops
```
gentoo:

```bash
$ sudo emerge dev-libs/libatomic_ops
```

gentoo:

homebrew:

```bash
$ brew install libatomic_ops
```

homebrew:

macports: install the following packages: libatomic_ops

```bash
$ sudo zypper install "pkgconfig(atomic_ops)"
```

macports: install the following packages: libatomic_ops

slackware:

```bash
$ sudo slackpkg install libatomic_ops
```

slackware:

void:

```bash
$ sudo xbps-install libatomic_ops-devel
```

void:

See https://repology.org/project/libatomic-ops/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.168 libbraiding: Computing with braids

**Description**

libbraiding is a library to compute several properties of braids, including centralizer and conjugacy check.

**License**

GPLv3+

**SPKG Maintainers**

- Miguel Marco

**Upstream Contact**

Miguel Marco (mmarco@unizar.es)
Type

standard

Dependencies

Version Information

package-version.txt:

1.1

Equivalent System Packages

arch:

$ sudo pacman -S libbraiding

conda:

$ conda install libbraiding

Debian/Ubuntu:

$ sudo apt-get install libbraiding-dev

Fedora/Redhat/CentOS:

$ sudo yum install libbraiding

freebsd:

$ sudo pkg install math/libbraiding

genoot:

$ sudo emerge sci-libs/libbraiding

nix:

$ nix-env --install libbraiding

opensuse:

$ sudo zypper install libbraiding-devel

void:

$ sudo xbps-install libbraiding-devel

See https://repology.org/project/libbraiding/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.169 *libffi: A portable foreign-function interface library*

**Description**

Compilers for high level languages generate code that follow certain conventions. These conventions are necessary, in part, for separate compilation to work. One such convention is the “calling convention”. The “calling convention” is essentially a set of assumptions made by the compiler about where function arguments will be found on entry to a function. A “calling convention” also specifies where the return value for a function is found.

Some programs may not know at the time of compilation what arguments are to be passed to a function. For instance, an interpreter may be told at run-time about the number and types of arguments used to call a given function. Libffi can be used in such programs to provide a bridge from the interpreter program to compiled code.

The libffi library provides a portable, high level programming interface to various calling conventions. This allows a programmer to call any function specified by a call interface description at run time.

FFI stands for Foreign Function Interface. A foreign function interface is the popular name for the interface that allows code written in one language to call code written in another language. The libffi library really only provides the lowest, machine dependent layer of a fully featured foreign function interface. A layer must exist above libffi that handles type conversions for values passed between the two languages.

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**Upstream Contact**

- https://sourceware.org/libffi/
- https://github.com/libffi/libffi

**Type**

standard
Dependencies

Version Information

package-version.txt:
3.2.1

Equivalent System Packages

conda:
$ conda install libffi

cygwin:
$ apt-cyg install libffi-devel

Debian/Ubuntu:
$ sudo apt-get install libffi-dev

Fedora/Redhat/CentOS:
$ sudo yum install libffi libffi-devel

freebsd:
$ sudo pkg install devel/libffi

homebrew:
$ brew install libffi

macports: install the following packages: libffi

opensuse:
$ sudo zypper install "pkgconfig(libffi)"

slackware:
$ sudo slackpkg install libffi

void:
$ sudo xbps-install libffi-devel

See https://repology.org/project/libffi/versions
If the system package is installed, ./configure will check whether it can be used.
4.1.170 **libgd: Dynamic graphics generation tool**

**Description**

GD is an open source code library for the dynamic creation of images by programmers. GD is written in C, and “wrappers” are available for Perl, PHP and other languages. GD creates PNG, JPEG, GIF, WebP, XPM, BMP images, among other formats. GD is commonly used to generate charts, graphics, thumbnails, and most anything else, on the fly. While not restricted to use on the web, the most common applications of GD involve website development.

**License**

- Custom (BSD-ish)

**Upstream Contact**

- [https://libgd.github.io](https://libgd.github.io)
- Pierre Joye (http://blog.thepimp.net)
- [http://libgd.bitbucket.org/](http://libgd.bitbucket.org/)

**Special Update/Build Instructions**

See spkg-src script.

**Type**

standard

**Dependencies**

- *libpng: Bitmap image support*
- *freetype: A free, high-quality, and portable font engine*
- *xz: General-purpose data compression software*

**Version Information**

package-version.txt:

```
2.3.2
```
Equivalent System Packages

alpine: install the following packages: gd

arch:

$ sudo pacman -S gd

conda:

$ conda install libgd

cygwin:

$ apt-cyg install libgd-devel

Debian/Ubuntu:

$ sudo apt-get install libgd-dev

Fedora/Redhat/CentOS:

$ sudo yum install gd gd-devel

freebsd:

$ sudo pkg install graphics/gd

genoo:

$ sudo emerge media-libs/gd

homebrew:

$ brew install gd

macports: install the following packages: gd2

nix:

$ nix-env --install gd

opensuse:

$ sudo zypper install gd "pkgconfig(gdlib)"

slackware:

$ sudo slackpkg install gd fontconfig libXpm libX11 libxcb libXau libXdmc

void:

$ sudo xbps-install gd-devel

See https://repology.org/project/gd/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.171 libgraphviz: Graph visualization software (callable library)

Description

Graphviz is open source graph visualization software. It has several main graph layout programs. They take descriptions of graphs in a simple text language, and make diagrams in several useful formats.

This script package represents the callable library.

License

Eclipse Public License 1.0

Upstream Contact

https://graphviz.org/about/

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: graphviz-dev
arch:

```
$ sudo pacman -S graphviz
```

conda:

```
$ conda install graphviz
```

cygwin:

```
$ apt-cyg install graphviz
```

Debian/Ubuntu:

```
$ sudo apt-get install libgraphviz-dev
```

Fedora/Redhat/CentOS:

```
$ sudo yum install graphviz
```

freebsd:

```
$ sudo pkg install graphics/graphviz
```
homebrew:

```bash
$ brew install graphviz
```

macports: install the following packages: graphviz

```bash
$ nix-env --install graphviz
```

opensuse:

```bash
$ sudo zypper install graphviz
```

void:

```bash
$ sudo xbps-install graphviz
```

See [https://repology.org/project/graphviz/versions](https://repology.org/project/graphviz/versions)

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.172 libhomfly: Compute the homfly polynomial of knots and links

**Description**

libhomfly is a library to compute the homfly polynomial of knots and links.

**License**

Public domain

**SPKG Maintainers**

- Miguel Marco

**Upstream Contact**

Miguel Marco (mmarco@unizar.es)

**Type**

standard
Dependencies

- gc: The Boehm-Demers-Weiser conservative garbage collector

Version Information

package-version.txt:

1.02r6

Equivalent System Packages

arch:

$ sudo pacman -S libhomfly

conda:

$ conda install libhomfly

Debian/Ubuntu:

$ sudo apt-get install libhomfly-dev

Fedora/Redhat/CentOS:

$ sudo yum install libhomfly-devel

freebsd:

$ sudo pkg install math/libhomfly

gentoo:

$ sudo emerge sci-libs/libhomfly

nix:

$ nix-env --install libhomfly

opensuse:

$ sudo zypper install libhomfly-devel

void:

$ sudo xbps-install libhomfly-devel

See https://repology.org/project/libhomfly/versions, https://repology.org/project/llibhomfly/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.173 liblzma: General-purpose data compression software

Description

This packages represents liblzma, a part of XZ Utils, the free general-purpose data compression software with a high compression ratio.

License

Some parts public domain, other parts GNU LGPLv2.1, GNU GPLv2, or GNU GPLv3.

Upstream Contact

http://tukaani.org/xz/

Type

standard

Dependencies

Version Information

package-version.txt:

5.2.5

Equivalent System Packages

conda:

$ conda install xz

cygwin:

$ apt-cyg install xz liblzma-devel

Debian/Ubuntu:

$ sudo apt-get install xz-utils liblzma-dev

Fedora/Redhat/CentOS:

$ sudo yum install xz xz-devel

homebrew:

$ brew install xz

macports: install the following packages: xz

opensuse:
$ sudo zypper install xz "pkgconfig(liblzma)"

slackware:

$ sudo slackpkg install xz

void:

$ sudo xbps-install xz liblzma-devel

See https://repology.org/project/xz/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.174 libnauty: Find automorphism groups of graphs, generate non-isomorphic graphs (callable library)

Description

Nauty has various tools for finding the automorphism group of a graph, generating non-isomorphic graphs with certain properties, etc.

This script package represents the callable library of nauty.

License

Since version 2.6, nauty license is GPL-compatible, see
http://users.cecs.anu.edu.au/~bdm/nauty/COPYRIGHT.txt
(a copy of this file, called COPYRIGHT, is also present in the tarball)

Special Packaging Instruction

Upstream distribute tarball named nauty${version}.tar.gz. We cannot deal with that so rename it nauty-${version}.tar.gz (notice the “-“) without any changes.

Upstream Contact

Brendan D. McKay Computer Science Department Australian National University bdm@cs.anu.edu.au
Adolfo Piperno Dipartimento di Informatica Sapienza - Università di Roma piperno@di.uniroma1.it
See http://cs.anu.edu.au/~bdm/nauty/ or http://pallini.di.uniroma1.it/
Type
optional

Dependencies

Version Information

Equivalent System Packages

Debian/Ubuntu:

```bash
$ sudo apt-get install libnauty-dev
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install libnauty-devel
```

homebrew:

```bash
$ brew install nauty
```

macports: install the following packages: nauty

void:

```bash
$ sudo xbps-install nauty-devel
```

See [https://repology.org/project/nauty/versions](https://repology.org/project/nauty/versions)

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.175 libogg: Library for the Ogg multimedia container format

**Description**

libogg is the official reference library for the Ogg multimedia container format, and the native file and stream format for the Xiph.org multimedia codecs. As with all Xiph.org technology is it an open format free for anyone to use.

Website: [http://www.xiph.org/ogg](http://www.xiph.org/ogg)

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Upstream Contact

The Xiph.org mailing lists - see http://lists.xiph.org/mailman/listinfo

Special Update/Build Instructions

• No changes went into src.

Type

optional

Dependencies

Version Information

package-version.txt:

1.3.1.p0

Equivalent System Packages

conda:

$ conda install libogg

homebrew:

$ brew install libogg

macports: install the following packages: libogg

opensuse:

$ sudo zypper install "pkgconfig(ogg)"

void:
$ sudo xbps-install libogg-devel

See https://repology.org/project/libogg/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.176 libpng: Bitmap image support

Description

libpng is the official PNG reference library. It supports almost all PNG features, is extensible, and has been extensively tested for over 13 years. The home site for development versions (i.e., may be buggy or subject to change or include experimental features) is http://libpng.sourceforge.net/, and the place to go for questions about the library is the png-mng-implement mailing list.

Website: http://www.libpng.org/pub/png/libpng.html

License

The libpng license - see http://www.libpng.org/pub/png/src/libpng-LICENSE.txt

Upstream Contact

https://libpng.sourceforge.io

The png mailing lists - see http://www.libpng.org/pub/png/pngmisc.html#lists

Special Update/Build Instructions

• On old versions of Darwin, the symbolic links libpng.* created by libpng16 may interfere with a system-wide libPng.dylib.
  – the following is very likely to be obsolete in 2014 —

  This system-wide library is likely to be a different version and on top of that, the symbols exported there are prefixed with “_cg” (for “Core Graphics”). So even if by chance the functionalities of the two libraries were interchangeable, libraries or applications looking for one and being presented the other won’t find the symbols they expect. Note the uppercase “P” which could prevent this conflict; unfortunately, the default filesystem used by Apple is case-insensitive.

  Note there would be no problem if the system-wide library was not looked for when Sage is being built or run, but that’s not the case either; it is at least looked for by the “ImageIO” framework:

  – when Python is built with Mac OS extensions, fixed in #4008;
  – when Mercurial is built because it uses $EDITOR, cf. #4678;
  – when R is built and it finds -lpng, cf. #4409 and #11696.

  – this is no longer done, as of #27186 —

  As not all of these problems are easily dealt with and new ones may arise, we chose to delete the $SAGE_LOCAL/lib/libpng.* symlinks. Therefore, some packages like Tachyon, which by default look for -1png are patched to look for -1png16 instead.
Type
standard

Dependencies

- *zlib: Data compression library*

Version Information

package-version.txt:

```
1.6.29.p1
```

Equivalent System Packages

conda:

```
$ conda install libpng
```

freebsd:

```
$ sudo pkg install graphics/png
```

homebrew:

```
$ brew install libpng
```

macports: install the following packages: libpng

openuse:

```
$ sudo zypper install "pkgconfig(libpng16)"
```

slackware:

```
$ sudo slackpkg install libpng
```

void:

```
$ sudo xbps-install libpng-devel
```

See https://repology.org/project/libpng/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.177 libsemigroups: Library for semigroups and monoids

Description

C++ library for semigroups and monoids; used in GAP’s package Semigroups.

License

GPL-3.0

Upstream Contact


Type

optional

Dependencies

Version Information

package-version.txt:

2.3.2

Equivalent System Packages

conda:

$ conda install libsemigroups

freebsd:

$ sudo pkg install math/libsemigroups

opensuse:

$ sudo zypper install "pkgconfig(libsemigroups)"

See https://repology.org/project/libsemigroups/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.178 libtheora: Library for the Theora video codec

Description
libtheora is the official reference library for the Theora video codec. Theora is a free and open video compression format from the Xiph.org Foundation.
Website: http://www.xiph.org/theora

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Upstream Contact
The Xiph.org mailing lists - see http://lists.xiph.org/mailman/listinfo

Special Update/Build Instructions
- No changes went into src.

Type
experimental
External Packages, Release 10.0

Dependencies

- *libogg*: Library for the Ogg multimedia container format
- *libpng*: Bitmap image support

Version Information

package-version.txt:

1.1.1

Equivalent System Packages

conda:

```
$ conda install libtheora
```

homebrew:

```
$ brew install theora
```

macports: install the following packages: libtheora

```
$ sudo zypper install "pkgconfig(theora)"
```

void:

```
$ sudo xbps-install libtheora-devel
```

See https://repology.org/project/libtheora/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.179 *libxml2*: XML parser and toolkit

Description

XML C parser and toolkit

License

MIT
Upstream Contact

http://www.xmlsoft.org/index.html

Type

optional

Dependencies

• iconv: Library for language/country-dependent character encodings
• zlib: Data compression library

Version Information

Equivalent System Packages

alpine: install the following packages: libxml2-dev

arch:

$ sudo pacman -S libxml2

cygwin:

$ apt-cyg install libxml2-devel

Debian/Ubuntu:

$ sudo apt-get install libxml2-dev

Fedora/Redhat/CentOS:

$ sudo yum install libxml2-devel

freebsd:

$ sudo pkg install libxml2

gentoo:

$ sudo emerge dev-libs/libxml2

homebrew:

$ brew install libxml2

macports: install the following packages: py-libxml2

nix:

$ nix-env --install libxml2

opensuse:
$ sudo zypper install libxml2

slackware:

$ sudo slackpkg install libxml2

void:

$ sudo xbps-install libxml2-devel

See https://repology.org/project/libxml2/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.180 lidia: A library for computational number theory

Description

A library for computational number theory.
Abandoned upstream and has disappeared from the web at TU Darmstadt.
We use as our new upstream a version minimally maintained for the LattE project.

License

lidia is released under the GPL, or so it is claimed. See https://groups.google.com/forum/#!msg/sage-devel/kTxgPSqrbUM/5Txj3_IKhIQJ and https://lists.debian.org/debian-legal/2007/07/msg00120.html

Upstream Contact

Matthias Köppe, UC Davis, CA, USA

Type

optional

Dependencies

- $(MP_LIBRARY)
Version Information

package-version.txt:

2.3.0+latte-patches-2019-05-02

Equivalent System Packages

See https://repology.org/project/lidia/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.181 lie: Library for the representation theory of complex semisimple Lie groups and algebras

Description

LiE is the name of a software package that enables mathematicians and physicists to perform computations of a Lie group theoretic nature. It focuses on the representation theory of complex semisimple (reductive) Lie groups and algebras, and on the structure of their Weyl groups and root systems.

LiE does not compute directly with elements of the Lie groups and algebras themselves; it rather computes with weights, roots, characters and similar objects. Some specialities of LiE are: tensor product decompositions, branching to subgroups, Weyl group orbits, reduced elements in Weyl groups, distinguished coset representatives and much more. These operations have been compiled into the program which results in fast execution: typically one or two orders of magnitude faster than similar programs written in a general purpose program.

The LiE programming language makes it possible to customise and extend the package with more mathematical functions. A user manual is provided containing many examples.

LiE establishes an interactive environment from which commands can be given that involve basic programming primitives and powerful built-in functions. These commands are read by an interpreter built into the package and passed to the core of the system. This core consists of programs representing some 100 mathematical functions. The interpreter offers on-line facilities which explain operations and functions, and which give background information about Lie group theoretical concepts and about currently valid definitions and values.

(from http://www-math.univ-poitiers.fr/~maavl/LiE/description.html )

License

GNU Lesser General Public License (LGPL), version unspecified

Upstream Contact

Dependencies

- readline
- ncurses
- bison (not included in this package or in Sage!)

Type

experimental

Dependencies

- readline: Command line editing library
- ncurses: Classic terminal output library

Version Information

package-version.txt:

2.2.2

Equivalent System Packages

Debian/Ubuntu:

$ sudo apt-get install lie

gentoo:

$ sudo emerge sci-mathematics/lie

macports: install the following packages: LiE

nix:

$ nix-env --install lie

opensuse:

$ sudo zypper install LiE

See https://repology.org/project/lie/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.182 linbox: Linear algebra with dense, sparse, structured matrices over the integers and finite fields

Description

LinBox is a C++ template library for exact, high-performance linear algebra computation with dense, sparse, and structured matrices over the integers and over finite fields.

License

LGPL V2 or later

Upstream Contact

- https://linalg.org/
- <linbox-devel@googlegroups.com>
- <linbox-use@googlegroups.com>

SPKG Repository

https://bitbucket.org/malb/linbox-spkg

Dependencies

- GNU patch
- GMP/MPIR
- MPFR
- NTL
- fpLLL
- IML
- M4RI
- M4RIE
- Givaro
- FFLAS/FFPACK
- a BLAS implementation such as openblas
**Special Update/Build Instructions**

TODO:

- spkg-check is disabled for now, should work in the next release after 1.3.2.
- Check whether make fullcheck works/builds, is worth running, and doesn’t take ages. (Version 1.1.6 doesn’t seem to have such a target.)

**Type**

standard

**Dependencies**

- \$\{MP_LIBRARY\}
- **ntl**: A library for doing number theory
- **givaro**: C++ library for arithmetic and algebraic computations
- **mpfr**: Multiple-precision floating-point computations with correct rounding
- **iml**: Integer Matrix Library
- **flint**: Fast Library for Number Theory
- **fflas_ffpack**: Dense linear algebra over word-size finite fields

**Version Information**

package-version.txt:

```
1.6.3.p1
```

**Equivalent System Packages**

arch:

```
$ sudo pacman -S linbox
```

conda:

```
$ conda install linbox
```

Debian/Ubuntu:

```
$ sudo apt-get install liblinbox-dev
```

Fedora/Redhat/CentOS:

```
$ sudo yum install linbox
```

freebsd:
$ sudo pkg install math/linbox

gentoo:
$ sudo emerge sci-libs/linbox

nix:
$ nix-env --install linbox

opensuse:
$ sudo zypper install "pkgconfig(linbox)"

void:
$ sudo xbps-install linbox-devel

See https://repology.org/project/linbox/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.183 llvm: The LLVM Compiler Infrastructure, including the Clang C/C++/Objective-C compiler

Description
The LLVM Project is a collection of modular and reusable compiler and toolchain technologies.
Clang is an “LLVM native” C/C++/Objective-C compiler.
The libc++ and libc++ ABI projects provide a standard conformant and high-performance implementation of the C++ Standard Library, including full support for C++11 and C++14.

License
Apache 2.0 License with LLVM exceptions

Upstream Contact
https://llvm.org/

Type
optional
**Dependencies**

**Version Information**

**Equivalent System Packages**

alpine: install the following packages: clang

arch:

```
$ sudo pacman -S clang
```

cygwin:

```
$ apt-cyg install clang
```

Debian/Ubuntu:

```
$ sudo apt-get install clang
```

Fedora/Redhat/CentOS:

```
$ sudo yum install clang
```

freebsd:

```
$ sudo pkg install devel/llvm
```

gentoo:

```
$ sudo emerge sys-devel/clang
```

homebrew:

```
$ brew install llvm
```

macports: install the following packages: clang

nix:

```
$ nix-env --install clang
```

opensbsd: install the following packages: devel/llvm

opensuse:

```
$ sudo zypper install llvm
```

slackware:

```
$ sudo slackpkg install llvm
```

void:

```
$ sudo xbps-install clang
```

If the system package is installed, `./configure` will check whether it can be used.
4.1.184 lrcalc: Littlewood-Richardson calculator

Description

Littlewood-Richardson Calculator
http://sites.math.rutgers.edu/~asbuch/lrcalc/

License

GNU General Public License V2+

Upstream Contact

Anders S. Buch (asbuch@math.rutgers.edu)
https://bitbucket.org/asbuch/lrcalc

Type

standard

Dependencies

Version Information

package-version.txt:

2.1

Equivalent System Packages

arch:

$ sudo pacman -S lrcalc

conda:

$ conda install lrcalc

Debian/Ubuntu:

$ sudo apt-get install liblrcalc-dev

Fedora/Redhat/CentOS:

$ sudo yum install lrcalc-devel

freebsd:

$ sudo pkg install math/lrcalc
**4.1.185 lrcalc_python: Littlewood-Richardson calculator**

**Description**

Python bindings for the Littlewood-Richardson Calculator

http://sites.math.rutgers.edu/~asbuch/lrcalc/

**License**

GNU General Public License V3

**Upstream Contact**

Anders S. Buch (asbuch@math.rutgers.edu)

https://bitbucket.org/asbuch/lrcalc

**Type**

standard

**Dependencies**

- $(PYTHON)
- lrcalc: Littlewood-Richardson calculator
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
Version Information

package-version.txt:

2.1

install-requires.txt:

lrcalc ~=2.1

Equivalent System Packages

conda:

$ conda install python-lrcalc~=2.1

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.186 lrslib: Reverse search algorithm for vertex enumeration and convex hull problems

Description

lrslib implements the linear reverse search algorithm of Avis and Fukuda.

See the homepage (http://cgm.cs.mcgill.ca/~avis/C/lrs.html) for details.

We use an autotoolized version from https://github.com/mkoeppe/lrslib/tree/autoconfiscation

License

lrslib is released under a GPL v2+ license.

Upstream Contact

David Avis, avis at cs dot mcgill dot edu.

Dependencies

To build and install the “plrs” binary, a multi-thread version of lrs, need to first install the full Boost package (“sage -i boost”).

If the package finds an MPI C++ compiler script (mpic++), it also builds and installs the “mplrs” binary, a distributed version of lrs using MPI.

(Sage currently does not make use of plrs and mplrs.)
Special Update/Build Instructions

Type
optional

Dependencies
• $(MP_LIBRARY)

Version Information

package-version.txt:

071b+autotools-2021-07-13

Equivalent System Packages

arch:

$ sudo pacman -S lrs

conda:

$ conda install lrslib

Debian/Ubuntu:

$ sudo apt-get install lrslib

Fedora/Redhat/CentOS:

$ sudo yum install lrslib

freebsd:

$ sudo pkg install math/lrslib

gentoo:

$ sudo emerge sci-libs/lrslib

nix:

$ nix-env --install lrs

opensuse:

$ sudo zypper install lrslib lrslib-devel

See https://repology.org/project/lrslib/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.187 m4ri: fast arithmetic with dense matrices over GF(2)

Description

M4RI: Library for matrix multiplication, reduction and inversion over GF(2). (See also m4ri/README for a brief overview.)

License

- GNU General Public License Version 2 or later (see src/COPYING)

Upstream Contact

- Authors: Martin Albrecht et al.
- Email: <m4ri-devel@googlegroups.com>
- Website: https://bitbucket.org/malb/m4ri

Special Update/Build Instructions

- Delete the upstream Mercurial repositories (file m4ri/.hgtags, directory m4ri/.hg).
- Delete the directory m4ri/autom4te.cache (if present).
- Delete m4ri.vcproj (and perhaps other unnecessary baggage).
- Touch m4ri/configure to make sure it is newer than its sources.

Type

standard

Dependencies

- libpng: Bitmap image support

Version Information

package-version.txt:

```
20200115
```
**Equivalent System Packages**

- **arch:**
  ```
  $ sudo pacman -S m4ri
  ```

- **conda:**
  ```
  $ conda install m4ri
  ```

- **Debian/Ubuntu:**
  ```
  $ sudo apt-get install libm4ri-dev
  ```

- **Fedora/Redhat/CentOS:**
  ```
  $ sudo yum install m4ri-devel
  ```

- **freebsd:**
  ```
  $ sudo pkg install math/m4ri
  ```

- **gentoo:**
  ```
  $ sudo emerge sci-libs/m4ri[png]
  ```

- **nix:**
  ```
  $ nix-env --install m4ri
  ```

- **opensuse:**
  ```
  $ sudo zypper install "pkgconfig(m4ri)"
  ```

- **void:**
  ```
  $ sudo xbps-install m4ri-devel
  ```

See [https://repology.org/project/libm4ri/versions](https://repology.org/project/libm4ri/versions)

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.188 m4rie: Arithmetic with dense matrices over GF(2^e)

**Description**

M4RIE: Library for matrix multiplication, reduction and inversion over GF(2^k) for 2 <= k <= 10.
License

- GNU General Public License Version 2 or later (see src/COPYING)

Upstream Contact

- Authors: Martin Albrecht
- Email: <m4ri-devel@googlegroups.com>
- Website: http://m4ri.sagemath.org

Dependencies

- M4RI
- Givaro

Type

standard

Dependencies

- m4ri: fast arithmetic with dense matrices over GF(2)

Version Information

package-version.txt:

20200115

Equivalent System Packages

arch:

$ sudo pacman -S m4rie

conda:

$ conda install m4rie

Debian/Ubuntu:

$ sudo apt-get install libm4rie-dev

Fedora/Redhat/CentOS:

$ sudo yum install m4rie-devel

freebsd:
$ sudo pkg install math/m4rie

genoot:

$ sudo emerge sci-libs/m4rie

nix:

$ nix-env --install m4rie

opensuse:

$ sudo zypper install "pkgconfig(m4rie)"

void:

$ sudo xbps-install m4rie-devel

See https://repology.org/project/libm4rie/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.189 markupsafe: Safely add untrusted strings to HTML/XML markup

Description

Implements a XML/HTML/XHTML Markup safe string for Python

License

Simplified BSD

Upstream Contact

Home page: http://github.com/mitsuhiko/markupsafe

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

2.1.1

install-requires.txt:

markupsafe >=1.1.0

Equivalent System Packages

conda:

$ conda install markupsafe

macports: install the following packages: py-markupsafe

opensuse:

$ sudo zypper install python3-MarkupSafe

void:

$ sudo xbps-install python3-MarkupSafe

See https://repology.org/project/python:markupsafe/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.190 mathics: A general-purpose computer algebra system

Description

A general-purpose computer algebra system.

License

GPL

Upstream Contact

https://pypi.org/project/Mathics3/
Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- pint: Physical quantities module
- palettable: Color palettes for Python
- mathics_scanner: Character Tables and Tokenizer for Mathics and the Wolfram Language.

Version Information

package-version.txt:

4.0.0

install-requires.txt:

Mathics3

Equivalent System Packages

conda:

$ conda install mathics3

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.191 mathics_scanner: Character Tables and Tokenizer for Mathics and the Wolfram Language.

Description

Character Tables and Tokenizer for Mathics and the Wolfram Language.

License

GPL-3.0-only
Upstream Contact

https://pypi.org/project/Mathics-Scanner/

Type

optional

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.2.4

install-requires.txt:

Mathics-Scanner

Equivalent System Packages

(none known)

4.1.192 mathjax: A JavaScript library for displaying mathematical formulas

Description

MathJax is a JavaScript library for displaying mathematical formulas. MathJax is used in the Sage documentation built by Sphinx.

License

Apache License, version 2.0

Upstream Contact

Home page: https://www.mathjax.org/
**Type**

standard

**Dependencies**

**Version Information**

package-version.txt:

```
3.2.0
```

**Equivalent System Packages**

conda:

```
$ conda install mathjax
```

opensuse:

```
$ sudo zypper install mathjax
```

void:

```
$ sudo xbps-install mathjax
```

See [https://repology.org/project/mathjax/versions](https://repology.org/project/mathjax/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/sagemath/sage/issues/27330)

**4.1.193 matplotlib: Python 2D plotting library**

**Description**

From the Matplotlib website: matplotlib is a python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. matplotlib can be used in python scripts, the python and ipython shell (ala matlab or mathematica), web application servers, and six graphical user interface toolkits.

**License**

The Matplotlib license - see [http://matplotlib.sourceforge.net/users/license.html](http://matplotlib.sourceforge.net/users/license.html): Matplotlib only uses BSD compatible code, and its license is based on the PSF license. See the Open Source Initiative licenses page for details on individual licenses. Non-BSD compatible licenses (eg LGPL) are acceptable in matplotlib Toolkits. For a discussion of the motivations behind the licencing choice, see Licenses.
Upstream Contact

https://matplotlib.org

The matplotlib mailing lists: see http://sourceforge.net/projects/matplotlib

Dependencies

• python
• numpy
• setuptools (>= 0.7)
• freetype
• patch (used in spkg-install)
• dateutil
• pyparsing
• tornado
• kiwisolver

Build Instructions/Changes

• NOTE: To drastically cut down on spkg size, we delete the internal testing images. To do this, we repackage
  the tarball by removing the contents of lib/matplotlib/tests/baseline_images/*, this is done by the
  spkg-src script.
• setup.py .patch: disable loading of Tests. Otherwise, setup.py raises an error because it can’t find the deleted
  files from src/lib/matplotlib/tests/baseline_images/*
• NOTE: as of matplotlib-1.0.0 and Sage 4.6, Sage does not use $HOME/.matplotlib by default. Instead, it sets
  MPLCONFIGDIR to a subdirectory in $DOT_SAGE, see src/bin/sage-env

Type

standard

Dependencies

• $(PYTHON)
• numpy: Package for scientific computing with Python
• freetype: A free, high-quality, and portable font engine
• pillow: Python Imaging Library
• dateutil: Extensions to the standard Python module datetime
• pyparsing: A Python parsing module
• tornado: Python web framework and asynchronous networking library
• six: Python 2 and 3 compatibility utilities
• cycler: Composable cycles

4.1. Details of external packages
External Packages, Release 10.0

- *qhull*: Compute convex hulls, Delaunay triangulations, Voronoi diagrams
- *fonttools*: Tools to manipulate font files
- *contourpy*: Python library for calculating contours of 2D quadrilateral grids
- *$(PYTHON_TOOLCHAIN)$*
- *kiwisolver*: An implementation of the Cassowary constraint solving algorithm
- *certifi*: Python package for providing Mozilla’s CA Bundle
- *setuptools_scm_git_archive*: setuptools_scm plugin for git archives

### Version Information

package-version.txt:

```
3.6.2
```

install-requires.txt:

```
# Trac #33642: Set lower bound for use of matplotlib color maps introduced in #33491, 
# and to suppress deprecation warnings (https://github.com/matplotlib/matplotlib/pull/ 
# #21073)
matplotlib >=3.5.1
```

### Equivalent System Packages

**conda:**

```bash
$ conda install "matplotlib>=3.5.1"
```

**macports:** install the following packages: py-matplotlib

**opensuse:**

```bash
$ sudo zypper install python3-matplotlib
```

**void:**

```bash
$ sudo xbps-install python3-matplotlib
```

See [https://repology.org/project/python:matplotlib/versions](https://repology.org/project/python:matplotlib/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/).
4.1.194 matplotlib_inline: Inline Matplotlib backend for Jupyter

**Description**

Inline Matplotlib backend for Jupyter

**License**

BSD 3-Clause

**Upstream Contact**

https://pypi.org/project/matplotlib-inline/

**Type**

standard

**Dependencies**

- $(PYTHON)
- *traitlets: Traitlets Python configuration system*
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
0.1.6
```

install-requires.txt:

```
matplotlib-inline
```

**Equivalent System Packages**

conda:

```
$ conda install matplotlib-inline
```

void:

```
$ sudo xbps-install python3-matplotlib-inline
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.195 maxima: System for manipulating symbolic and numerical expressions

Description

Maxima is a system for the manipulation of symbolic and numerical expressions, including differentiation, integration, Taylor series, Laplace transforms, ordinary differential equations, systems of linear equations, polynomials, and sets, lists, vectors, matrices, and tensors. Maxima yields high precision numeric results by using exact fractions, arbitrary precision integers, and variable precision floating point numbers. Maxima can plot functions and data in two and three dimensions.

For more information, see the Maxima web site

http://maxima.sourceforge.net

License

Maxima is distributed under the GNU General Public License, with some export restrictions from the U.S. Department of Energy. See the file COPYING.

Upstream Contact

• The Maxima mailing list - see http://maxima.sourceforge.net/maximalist.html

Special Update/Build Instructions

1. Go to http://sourceforge.net/projects/maxima/files/Maxima-source/ and download the source tarball maxima-x.y.z.tar.gz; place it in the upstream/ directory.
3. Make sure the patches still apply cleanly, and update them if necessary.
4. Test the resulting package.

All patch files in the patches/ directory are applied. Descriptions of these patches are either in the patch files themselves or below.

• 0001-taylor2-Avoid-blowing-the-stack-when-diff-expand-isn.patch: Fix for Maxima bug #2520 (abs_integrate fails on abs(sin(x)) and abs(cos(x))). Introduced in Trac #13364 (Upgrade Maxima to 5.29.1).
• build-fasl.patch: Build a fasl library for ecl in addition to an executable program. Introduced in Trac #16178 (Build maxima fasl without asdf).
• infodir.patch: Correct the path to the Info directory.Introduced in Trac #11348 (maxima test fails when install tree is moved).
• matrixexp.patch: Fix matrixexp(matrix([%i*%pi])), which broke after Maxima 5.29.1. Introduced in Trac #13973.
• maxima.system.patch: Set c::*compile-in-constants* to t. Introduced in Trac #11966 (OS X 10.7 Lion: Maxima fails to build).
• undoing_true_false_printing_patch.patch: Revert an upstream change causing ‘?’ to be printed around some words. Introduced in Trac #13364 (Upgrade Maxima to 5.29.1).
Type

standard

Dependencies

- *ecl: An implementation of the Common Lisp language*

Version Information

package-version.txt:

5.45.0.p0

Equivalent System Packages

arch:

$ sudo pacman -S maxima-ecl

conda:

$ conda install maxima

Debian/Ubuntu:

$ sudo apt-get install maxima-sage maxima

homebrew:

$ brew install maxima

macports: install the following packages: maxima

nix:

$ nix-env --install maxima-ecl

opensuse:

$ sudo zypper install maxima-exec-clisp

void:

$ sudo xbps-install maxima-ecl


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1. Details of external packages
4.1.196 mcqd: An exact algorithm for finding a maximum clique in an undirected graph

Description

MaxCliqueDyn is a fast exact algorithm for finding a maximum clique in an undirected graph.

License

GPL 3

Upstream Contact

MCQD is currently being maintained by Janez Konc. https://gitlab.com/janezkonc/mcq

Type

optional

Dependencies

Version Information

package-version.txt:

1.0.p0

Equivalent System Packages

arch:

$ sudo pacman -S mcqd

opensuse:

$ sudo zypper install mcqd

See https://repology.org/project/mcq/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.197 meataxe: Library for computing with modular representations

Description

SharedMeatAxe 1.0 is an autotoolized shared library version of C MeatAxe 2.4.24, a set of programs for computing with modular representations. The package comprises a shared library “libmtx”, as well as several executables.

See http://users.minet.uni-jena.de/~king/SharedMeatAxe/ for the package documentation.

Licence

The Shared Meat-Axe is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 2 of the License, or (at your option) any later version. See the file COPYING.

Upstream contact

- Simon King <simon.king@uni-jena.de>

Type

optional

Dependencies

Version Information

package-version.txt:

1.0.1

Equivalent System Packages

arch:

$ sudo pacman -S shared_meataxe

Fedora/Redhat/CentOS:

$ sudo yum install sharedmeataxe

See https://repology.org/project/shared-meataxe/versions, https://repology.org/project/sharedmeataxe/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.198 memory_allocator: An extension class to allocate memory easily with Cython

This extension class started as part of the Sage software.

Description

development website: https://github.com/sagemath/memory_allocator
PyPI page: https://pypi.org/project/memory_allocator

License

GPL-3.0

Upstream Contact

https://github.com/sagemath/memory_allocator

Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.1.3

install-requires.txt:

memory_allocator
**Equivalent System Packages**

conda:

```
$ conda install memory-allocator
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/SageMath/sage/issues/29023)

### 4.1.199 meson: A high performance build system

**Description**

A high performance build system

**License**

Apache License, Version 2.0

**Upstream Contact**

https://pypi.org/project/meson/

**Type**

standard

**Dependencies**

- `$(PYTHON)`
- `$(PYTHON_TOOLCHAIN)`

**Version Information**

package-version.txt:

```
1.0.1
```

install-requires.txt:

```
meson
```
**Equivalent System Packages**

alpine: install the following packages: meson

arch:

```
$ sudo pacman -S meson
```

Debian/Ubuntu:

```
$ sudo apt-get install meson
```

Fedora/Redhat/CentOS:

```
$ sudo yum install meson
```

freebsd:

```
$ sudo pkg install devel/meson
```

genoo:

```
$ sudo emerge dev-util/meson
```

homebrew:

```
$ brew install meson
```

nix:

```
$ nix-env --install meson
```

opensuse:

```
$ sudo zypper install meson
```

slackware:

```
$ sudo slackpkg install meson
```

See [https://repology.org/project/meson/versions](https://repology.org/project/meson/versions)

If the system package is installed, ./configure will check whether it can be used.

**4.1.200 meson_python: Meson Python build backend (PEP 517)**

**Description**

Meson Python build backend (PEP 517)
License

Upstream Contact

https://pypi.org/project/meson-python/

Type

standard

Dependencies

- $(PYTHON)
- meson: A high performance build system
- pyproject_metadata: PEP 621 metadata parsing
- toml: A lil' TOML parser
- ninja_build: A build system with a focus on speed
- patchelf: A small utility to modify the dynamic linker and RPATH of ELF executables
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.12.1

install-requires.txt:

meson-python

Equivalent System Packages

(none known)

4.1.201 mistune: A markdown parser in pure Python

Description

The fastest markdown parser in pure Python
License

BSD License

Upstream Contact

Home Page: https://github.com/lepture/mistune

Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.0.4

install-requires.txt:

mistune >=0.8.4

Equivalent System Packages

conda:

$ conda install mistune

void:

$ sudo xbps-install python3-mistune

See https://repology.org/project/mistune/versions, https://repology.org/project/python:mistune/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.202 modular_decomposition: A modular decomposition algorithm

Description

This is an implementation of a modular decomposition algorithm.

http://www.liafa.jussieu.fr/~fm/ (in french)

License

GPL

Upstream Contact

Fabien de Montgolfier

http://www.liafa.jussieu.fr/~fm/

Type

experimental

Dependencies

Version Information

package-version.txt:

20100607

Equivalent System Packages

See https://repology.org/project/modular-decomposition/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.203 p_group_cohomology: Modular cohomology rings of finite groups

Description

Modular Cohomology Rings of Finite Groups

The package is located at http://users.fmi.uni-jena.de/cohomology/, that’s to say the tarball p_group_cohomology-x.y.tar.xz can be found there and the documentation of the package is provided at http://users.fmi.uni-jena.de/cohomology/documentation/
License

Copyright (C) 2018 Simon A. King <simon.king@uni-jena.de> Copyright (C) 2011 Simon A. King <simon.king@uni-jena.de> Copyright (C) 2009 Simon A. King <simon.king@nuigalway.ie> and David J. Green <david.green@uni-jena.de>

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This code is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

The full text of the GPL is available at:

http://www.gnu.org/licenses/

The package includes a data base of cohomology rings of the groups of order 64 and provides access to a data base of cohomology rings of the groups of order 128 and 243, located at

http://cohomology.uni-jena.de/db/

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http://creativecommons.org/licenses/by-sa/3.0/

SPKG Maintainers

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Upstream Contact

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Acknowledgements

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We thank William Stein for giving us access to various computers on which we could build test the SPKG and on which some huge computations could be completed, and acknowledge the support by National Science Foundation Grant No. DMS-0821725.

We thank Mathieu Dutour Sikirić for hints on how to use GAP more efficiently.

We owe Peter Symonds the idea of using the Poincaré series in a rather efficient completeness criterion.

We are grateful to John Palmieri for his help on making p_group_cohomology work with python-3.
Dependencies

- The SharedMeatAxe needs to be installed, as a build time dependency.
  This can be met by installing the meataxe spkg

Testing

Our package provides a very short test suite for David Green’s routines for the computation of minimal projective resolutions. The majority of this package’s tests is formed by doc tests in the Cython code. In fact, any class, method and function is covered by tests.

Note that internet access is required for these tests, as it is attempted to download cohomology rings from a public data base in the web.

The script `spkg-check` calls `sage -t --force_lib` on the files in `pGroupCohomology`.

Documentation

The documentation of this package is automatically built, if the environment variable `SAGE_SPKG_INSTALL_DOCS` is yes (do “export SAGE_SPKG_INSTALL_DOCS=yes” on the command line before installation). The documents are put into `SAGE_ROOT/local/share/doc/p_group_cohomology/`.

Type

optional

Dependencies

- `singular`: Computer algebra system for polynomial computations, algebraic geometry, singularity theory
- `meataxe`: Library for computing with modular representations

Version Information

package-version.txt:

```
1.1
```

Equivalent System Packages

(none known)
4.1.204 mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding

Description

From https://www.multiprecision.org/mpc: GNU MPC is a C library for the arithmetic of complex numbers with arbitrarily high precision and correct rounding of the result. It extends the principles of the IEEE-754 standard for fixed precision real floating point numbers to complex numbers, providing well-defined semantics for every operation. At the same time, speed of operation at high precision is a major design goal.

License

LGPLv3+ for the code and GFDLv1.3+ (with no invariant sections) for the documentation.

Upstream Contact

The MPC website is located at https://www.multiprecision.org/mpc.
The MPC team can be contacted via the MPC mailing list: mpc-discuss@inria.fr

Special Update/Build Instructions

- mpc_mul_faster.patch: Patch from Paul Zimmermann to speed up MPC multiplication (for small precisions) by reducing overhead in MPFR operations.

Type

standard

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding

Version Information

package-version.txt:

1.1.0
Equivalent System Packages

conda:

```bash
$ conda install mpc
```

cygwin:

```bash
$ apt-cyg install libmpc-devel
```

Debian/Ubuntu:

```bash
$ sudo apt-get install libmpc-dev
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install libmpc libmpc-devel
```

freebsd:

```bash
$ sudo pkg install math/mpc
```

genoo:

```bash
$ sudo emerge dev-libs/mpc
```

homebrew:

```bash
$ brew install libmpc
```

nix:

```bash
$ nix-env --install libmpc
```

opensuse:

```bash
$ sudo zypper install mpc-devel
```

void:

```bash
$ sudo xbps-install libmpc-devel
```

See https://repology.org/project/libmpc/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.205 mpc: Multiple precision interval arithmetic library based on MPFR

**Description**

MPFI is a library for interval arithmetic, which is built upon the MPFR multiple precision floating-point arithmetic.

MPFI is intended to be a portable library written in C for arbitrary precision interval arithmetic with intervals represented using MPFR reliable floating-point numbers. It is based on the GNU MP library and on the MPFR library. The purpose of an arbitrary precision interval arithmetic is on the one hand to get “guaranteed” results, thanks to interval computation, and on the other hand to obtain accurate results, thanks to multiple precision arithmetic. The MPFI library

---

**4.1. Details of external packages**
is built upon MPFR in order to benefit from the correct rounding provided, for each operation or function, by MPFR. Further advantages of using MPFR are its portability and compliance with the IEEE 754 standard for floating-point arithmetic.

License

This version of MPFI is released under the GNU Lesser General Public License. It is permitted to link MPFI to non-free programs, as long as when distributing them the MPFI source code and a means to re-link with a modified MPFI is provided.

Upstream Contact

http://perso.ens-lyon.fr/nathalie.revol/software.html

The MPFI website is located at https://gitlab.inria.fr/mpfi/mpfi

The MPFI team can be contacted via the MPFI mailing list: mpfi-users@inria.fr

Type

standard

Dependencies

- $(MP_LIBRARY)
  - mpfr: Multiple-precision floating-point computations with correct rounding

Version Information

package-version.txt:

1.5.2

Equivalent System Packages

conda:

$ conda install mpfi

Debian/Ubuntu:

$ sudo apt-get install libmpfi-dev

freebsd:

$ sudo pkg install math/mpfi

gentoo:

$ sudo emerge sci-libs/mpfi
homebrew:

```bash
$ brew install mpfi
```

nix:

```bash
$ nix-env --install mpfi
```

opensuse:

```bash
$ sudo zypper install mpfi-devel
```

void:

```bash
$ sudo xbps-install mpfi-devel
```

See https://repology.org/project/mpfi/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.206 mpfr: Multiple-precision floating-point computations with correct rounding

**Description**

The MPFR library is a C library for multiple-precision floating-point computations with correct rounding. MPFR has continuously been supported by the INRIA and the current main authors come from the Caramba and AriC project-teams at Loria (Nancy, France) and LIP (Lyon, France) respectively; see more on the credit page. MPFR is based on the GMP multiple-precision library.

The main goal of MPFR is to provide a library for multiple-precision floating-point computation which is both efficient and has a well-defined semantics. It copies the good ideas from the ANSI/IEEE-754 standard for double-precision floating-point arithmetic (53-bit significand).

**License**

MPFR is free. It is distributed under the GNU Lesser General Public License (GNU Lesser GPL), version 3 or later (2.1 or later for MPFR versions until 2.4.x). The library has been registered in France by the Agence de Protection des Programmes under the number IDDN FR 001 120020 00 R P 2000 000 10800, on 15 March 2000. This license guarantees your freedom to share and change MPFR, to make sure MPFR is free for all its users. Unlike the ordinary General Public License, the Lesser GPL enables developers of non-free programs to use MPFR in their programs. If you have written a new function for MPFR or improved an existing one, please share your work!

**Upstream Contact**

The MPFR website is located at http://mpfr.org/

The MPFR team can be contacted via the MPFR mailing list: mpfr@loria.fr
Special Update/Build Instructions

- Make sure MPFR’s settings of CC and CFLAGS still get properly extracted, currently from its config.log in the src/ directory.
- We should remove the configure option --disable-thread-safe in case the issues without that have meanwhile been fixed. (Then we should actually pass --enable-thread-safe.)

TODO

- --disable-thread-safe should be switched to --enable-thread-safe, need to check that this works on the buildbot machines

Type

standard

Dependencies

- $(MP_LIBRARY)

Version Information

package-version.txt:

4.0.1.p0

Equivalent System Packages

conda:

$ conda install mpfr

cygwin:

$ apt-cyg install libmpfr-devel

Debian/Ubuntu:

$ sudo apt-get install libmpfr-dev

Fedora/Redhat/CentOS:

$ sudo yum install mpfr-devel

freebsd:

$ sudo pkg install math/mpfr

gentoo:
$ sudo emerge dev-libs/mpfr

homebrew:

$ brew install mpfr

opensuse:

$ sudo zypper install "pkgconfig(mpfr)"

slackware:

$ sudo slackpkg install mpfr

void:

$ sudo xbps-install mpfr-devel

See https://repology.org/project/mpfr/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.207 mpfrcx: Arithmetic of univariate polynomials over arbitrary precision real or complex numbers

Description

Mpfrcx is a library for the arithmetic of univariate polynomials over arbitrary precision real (Mpfr) or complex (Mpc) numbers, without control on the rounding. For the time being, only the few functions needed to implement the floating point approach to complex multiplication are implemented. On the other hand, these comprise asymptotically fast multiplication routines such as Toom–Cook and the FFT.

License

MPFRCX is distributed under the Gnu Lesser General Public License, either version 2.1 of the licence, or (at your option) any later version (LGPLv2.1+).

Upstream Contact

The MPFRCX website is located at http://www.multiprecision.org/mpfrcx.

Type

optional
Dependencies

- $(MP_LIBRARY)
- **mpfr**: Multiple-precision floating-point computations with correct rounding
- **mpc**: Arithmetic of complex numbers with arbitrarily high precision and correct rounding

Version Information

package-version.txt:

```
0.5
```

Equivalent System Packages

**opensuse**:

```
$ sudo zypper install mpfr-cx-devel
```

See [https://repology.org/project/mpfr-cx/versions](https://repology.org/project/mpfr-cx/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/fredrik-johansson/mpmath/)

4.1.208 mpmath: Pure Python library for multiprecision floating-point arithmetic

Description

Mpmath is a pure-Python library for multiprecision floating-point arithmetic. It provides an extensive set of transcendental functions, unlimited exponent sizes, complex numbers, interval arithmetic, numerical integration and differentiation, root-finding, linear algebra, and much more. Almost any calculation can be performed just as well at 10-digit or 1000-digit precision, and in many cases mpmath implements asymptotically fast algorithms that scale well for extremely high precision work. If available, mpmath will (optionally) use gmpy to speed up high precision operations.

Upstream Contact

- **Author**: Fredrik Johansson
- **Email**: fredrik.johansson@gmail.com
- **http://mpmath.org**
- **Website**: [https://github.com/fredrik-johansson/mpmath/](https://github.com/fredrik-johansson/mpmath/)
Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.2.1

install-requires.txt:

mpmath >=1.1.0

Equivalent System Packages

conda:

$ conda install mpmath

void:

$ sudo xbps-install python3-mpmath


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.209 msolve: Multivariate polynomial system solver

Description

Open source C library implementing computer algebra algorithms for solving polynomial systems (with rational coefficients or coefficients in a prime field).
License

GPL v2+

Upstream Contact

https://github.com/algebraic-solving/msolve

Type

optional

Dependencies

- $(MP_LIBRARY)
- flint: Fast Library for Number Theory
- mpfr: Multiple-precision floating-point computations with correct rounding

Version Information

package-version.txt:

0.4.9

Equivalent System Packages

(none known)

4.1.210 nauty: Find automorphism groups of graphs, generate non-isomorphic graphs

Description

Nauty has various tools for finding the automorphism group of a graph, generating non-isomorphic graphs with certain properties, etc.

License

Since version 2.6, nauty license is GPL-compatible, see
http://users.cecs.anu.edu.au/~bdm/nauty/COPYRIGHT.txt
(a copy of this file, called COPYRIGHT, is also present in the tarball)
Special Packaging Instruction

Upstream distribute tarball named nauty${version}.tar.gz. We cannot deal with that so rename it nauty-${version}.tar.gz (notice the “-“) without any changes.

Upstream Contact

Brendan D. McKay, Computer Science Department Australian National University bdm@cs.anu.edu.au
Adolfo Piperno, Dipartimento di Informatica Sapienza - Università di Roma piperno@di.uniroma1.it

Type

standard

Dependencies

Version Information

package-version.txt:

27r1.p1

Equivalent System Packages

arch:

$ sudo pacman -S nauty

conda:

$ conda install nauty

Debian/Ubuntu:

$ sudo apt-get install nauty

Fedora/Redhat/CentOS:

$ sudo yum install nauty

freebsd:

$ sudo pkg install math/nauty

homebrew:

$ brew install nauty

nix:
$ nix-env --install nauty

opensuse:
$sudo zypper install nauty nauty-devel

void:
$sudo xbps-install nauty

See https://repology.org/project/nauty/versions
If the system package is installed, `./configure` will check whether it can be used.

4.1.211 nbclient: A client library for executing notebooks. Formerly nbconvert’s ExecutePreprocessor.

Description
A client library for executing notebooks. Formerly nbconvert’s ExecutePreprocessor.

License
BSD

Upstream Contact
https://pypi.org/project/nbclient/

Type
standard

Dependencies
- `${PYTHON}
- jupyter_client: Jupyter protocol implementation and client libraries
- nbformat: Base implementation of the Jupyter notebook format
- `${PYTHON_TOOLCHAIN}`
Version Information

package-version.txt:

0.7.0

install-requires.txt:

nbclient

Equivalent System Packages

conda:

$ conda install nbclient

void:

$ sudo xbps-install python3-nbclient

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.212 nbconvert: Converting Jupyter Notebooks

Description

jupyter nbconvert converts notebooks to various other formats via Jinja templates.

License

BSD

Upstream Contact

https://pypi.org/project/nbconvert/

Type

standard
External Packages, Release 10.0

Dependencies

- $(PYTHON)
- mistune: A markdown parser in pure Python
- jinja2: General purpose template engine for Python
- pygments: Generic syntax highlighter
- traitlets: Traitlets Python configuration system
- jupyter_core: Jupyter core package
- nbformat: Base implementation of the Jupyter notebook format
- entrypoints: Discover and load entry points from installed Python packages
- bleach: An HTML-sanitizing tool
- pandocfilters: A Python module for writing pandoc filters
- defusedxml: Addresses vulnerabilities of XML parsers and XML libraries
- jupyter_client: Jupyter protocol implementation and client libraries
- jupyterlab_pygments: Pygments theme using JupyterLab CSS variables
- nbclient: A client library for executing notebooks. Formerly nbconvert’s ExecutePreprocessor.
- beautifulsoup4: Screen-scraping library
- markupsafe: Safely add untrusted strings to HTML/XML markup
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

7.2.3

install-requires.txt:

nbconvert >=5.6.1

Equivalent System Packages

conda:

$ conda install nbconvert

opensuse:

$ sudo zypper install jupyter-nbconvert

void:

$ sudo xbps-install python3-jupyter_nbconvert

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.213 nbformat: Base implementation of the Jupyter notebook format

**Description**

This package contains the base implementation of the Jupyter Notebook format, and Python APIs for working with notebooks.

**Type**

standard

**Dependencies**

- $(PYTHON)
- jsonschema: Python implementation of JSON Schema
- fastjsonschema: Fastest Python implementation of JSON schema
- jupyter_core: Jupyter core package
- traitlets: Traitlets Python configuration system
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend
- hatch_nodejs_version: Hatch plugin for versioning from a package.json file

**Version Information**

package-version.txt:

```
5.7.0
```

install-requires.txt:

```
nbformat >=5.0.7
```
Equivalent System Packages

conda:

```
$ conda install nbformat
```

opensuse:

```
$ sudo zypper install jupyter-nbformat
```

void:

```
$ sudo xbps-install python3-jupyter_nbformat
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.214 ncurses: Classic terminal output library

Description

Ncurses (new curses, pronounced “enn-curses”) started as a freely distributable “clone” of System V Release 4.0 (SVr4) curses. It has outgrown the “clone” description, and now contains many features which are not in SVr4 curses. Curses is a pun on the term “cursor optimization”. It is a library of functions that manage an application’s display on character-cell terminals (e.g., VT100).

The name “ncurses” was first used as the name of the curses library in Pavel Curtis’s pcurses, dated 1982. It was apparently developed on a BSD 4.4 system, at Cornell. Parts of pcurses are readily identifiable in ncurses, including the basics for the terminfo compiler (named compile in that package):

- the Caps, used to define the terminfo capabilities
- awk scripts MKcaptab.awk, MKnames.awk
- the library modules used for the terminfo compiler.

Besides ncurses, parts of pcurses still survive in 2010, in recognizable form in Solaris.

Website: http://invisible-island.net/ncurses

License

- MIT-style
Upstream Contact

- bug-ncurses@gnu.org

Special Update/Build Instructions

None

Type

standard

Dependencies

Version Information

package-version.txt:

6.3

Equivalent System Packages

conda:

$ conda install ncurses

cygwin:

$ apt-cyg install libncurses-devel

Debian/Ubuntu:

$ sudo apt-get install libncurses5-dev

Fedora/Redhat/CentOS:

$ sudo yum install ncurses-devel

freebsd:

$ sudo pkg install devel/ncurses

homebrew:

$ brew install ncurses

macports: install the following packages: ncurses

opensuse:

$ sudo zypper install "pkgconfig(ncurses)" "pkgconfig(ncursesw)"

slackware:
$ sudo slackpkg install ncurses

void:

$ sudo xbps-install ncurses-devel

See https://repology.org/project/ncurses/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.215 nest_asyncio: Patch asyncio to allow nested event loops

Description
Patch asyncio to allow nested event loops

License
BSD

Upstream Contact
https://pypi.org/project/nest-asyncio/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
1.5.6
install-requires.txt:
nest-asyncio
Equivalent System Packages

conda:

```
$ conda install nest-asyncio
```

void:

```
$ sudo xbps-install python3-nest_asyncio
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.216 networkx: Python package for complex networks

Description

NetworkX (NX) is a Python package for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks.

License

BSD

Upstream Contact

https://networkx.github.io/

Type

standard

Dependencies

- $(PYTHON)
- decorator: Python library providing decorators
- $(PYTHON_TOOLCHAIN)
- scipy: Scientific tools for Python
**Version Information**

package-version.txt:

```
2.8.8
```

install-requires.txt:

```
# features removed in 3.0 listed in https://networkx.org/documentation/stable/developer/_deprecations.html#version-3-0
networkx >=2.4, <3.0
```

**Equivalent System Packages**

conda:

```
$ conda install networkx<3.0,>=2.4
```

macports: install the following packages: py-networkx

opensuse:

```
$ sudo zypper install python3-networkx
```

void:

```
$ sudo xbps-install python3-networkx
```

See https://repology.org/project/python:networkx/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.217 nibabel: Access a multitude of neuroimaging data formats

**Description**

Access a multitude of neuroimaging data formats

**License**

MIT License
Upstream Contact

https://pypi.org/project/nibabel/

Type

optional

Dependencies

Version Information

requirements.txt:

nibabel

Equivalent System Packages

conda:

$ conda install nibabel

macports: install the following packages: py-nibabel

opensuse:

$ sudo zypper install python3-nibabel


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.218 ninja_build: A build system with a focus on speed

Description

Ninja is a small build system with a focus on speed.

License

Apache License 2.0

4.1. Details of external packages 299
External Packages, Release 10.0

Upstream Contact

https://ninja-build.org/

Type

standard

Dependencies

- $(PYTHON)

Version Information

package-version.txt:

1.11.0

Equivalent System Packages

arch:

$ sudo pacman -S ninja

conda:

$ conda install ninja

cygwin:

$ apt-cyg install ninja

Debian/Ubuntu:

$ sudo apt-get install ninja-build

Fedora/Redhat/CentOS:

$ sudo yum install ninja-build

freebsd:

$ sudo pkg install devel/ninja

gentoo:

$ sudo emerge dev-util/ninja

homebrew:

$ brew install ninja
macports: install the following packages: ninja

opensuse:

```bash
$ sudo zypper install ninja
```

void:

```bash
$ sudo xbps-install ninja
```

See https://repology.org/project/ninja/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.219 nodeenv: A tool to create isolated node.js environments

**Description**

nodeenv (node.js virtual environment) is a tool to create isolated node.js environments.

It creates an environment that has its own installation directories, that doesn’t share libraries with other node.js virtual environments.

**License**

BSD License

**Upstream Contact**

Home page: https://github.com/ekalinin/nodeenv

**Type**

optional

**Dependencies**

- `$PYTHON`
- `$PYTHON_TOOLCHAIN`
- `certifi`: Python package for providing Mozilla’s CA Bundle
Version Information

requirements.txt:

```
nodeenv ~= 1.4.0
```

Equivalent System Packages

conda:

```
$ conda install nodeenv
```

homebrew:

```
$ brew install nodeenv
```


However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.220 nodejs: A JavaScript runtime built on Chrome’s V8 JavaScript engine

Description

Node.js® is a JavaScript runtime built on Chrome’s V8 JavaScript engine.

It is installed into an isolated nodeenv.

License

MIT License

Upstream Contact

Home page: https://nodejs.org/

Type

optional

Dependencies

- nodeenv: A tool to create isolated node.js environments
**Version Information**

package-version.txt:

```
12.18.3
```

**Equivalent System Packages**

conda:

```
$ conda install nodejs
```

homebrew:

```
$ brew install node
```

opensuse:

```
$ sudo zypper install nodejs
```

void:

```
$ sudo xbps-install nodejs
```

See https://repology.org/project/nodejs/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

**4.1.221 normaliz: Computations in affine monoids, vector configurations, lattice polytopes, and rational cones**

**Description**

Normaliz is a tool for computations in affine monoids, vector configurations, lattice polytopes, and rational cones.

For more details see http://www.mathematik.uni-osnabrueck.de/normaliz/

**License**

- GPL v3

**Upstream Contact**

- normaliz@uos.de
- Winfried Bruns <wbruns@uos.de>
- Christof Söger <csoeger@uos.de>
- see also https://www.normaliz.uni-osnabrueck.de/home/contact/
  and https://github.com/Normaliz
Special Update/Build Instructions

- The spkg currently disables features that require packages SCIP and CoCoA, for which we don’t have packages (yet).

Type

optional

Dependencies

- $\$(MP\_LIBRARY)$
- flint: Fast Library for Number Theory
- e_antic: Real embedded number fields
- libnauty: Find automorphism groups of graphs, generate non-isomorphic graphs (callable library)

Version Information

package-version.txt:

3.10.0

Equivalent System Packages

arch:

$ sudo pacman -S normaliz

conda:

$ conda install normaliz

Debian/Ubuntu:

$ sudo apt-get install libnormaliz-dev

Fedora/Redhat/CentOS:

$ sudo yum install libnormaliz-devel

genoot:

$ sudo emerge sci-mathematics/normaliz

opensuse:

$ sudo zypper install normaliz-devel

See https://repology.org/project/normaliz/versions, https://repology.org/project/libnormaliz/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.222 notebook: Jupyter notebook, a web-based notebook environment for interactive computing

Description

The Jupyter HTML notebook is a web-based notebook environment for interactive computing.

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- ipython: Interactive computing environment with an enhanced interactive Python shell
- jupyter_client: Jupyter protocol implementation and client libraries
- ipykernel: IPython Kernel for Jupyter
- nbconvert: Converting Jupyter Notebooks
- nbformat: Base implementation of the Jupyter notebook format
- jinja2: General purpose template engine for Python
- tornado: Python web framework and asynchronous networking library
- terminado: Tornado websocket backend for the term.js Javascript terminal emulator library
- send2trash: Send file to trash natively under Mac OS X, Windows and Linux
- prometheus_client: Python client for the systems monitoring and alerting toolkit Prometheus
- argon2_cffi: The secure Argon2 password hashing algorithm

Version Information

package-version.txt:

6.4.12

install-requires.txt:

notebook >=6.1.1
Equivalent System Packages

arch:

$ sudo pacman -S jupyter-notebook

conda:

$ conda install notebook

macports: install the following packages: py-notebook

void:

$ sudo xbps-install python3-jupyter_notebook

See https://repology.org/project/python:notebook/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.223 notedown: Create IPython notebooks from markdown

Description

Notedown is a simple tool to create IPython notebooks from markdown.

License

BSD 2-Clause License

Upstream Contact

Author: Aaron O’Leary Home page: https://github.com/aaren/notedown

Type

optional

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)
• pip: Tool for installing and managing Python packages
• nbformat: Base implementation of the Jupyter notebook format
• nbconvert: Converting Jupyter Notebooks
• six: Python 2 and 3 compatibility utilities
• pandoc_attributes: A parser and generator for pandoc block attributes
Version Information

package-version.txt:

1.5.1

install-requires.txt:

notedown >= 1.5.1

Equivalent System Packages

conda:

$ conda install notedown

See https://repology.org/project/python:notedown/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.224 ntl: A library for doing number theory

Description

NTL is a high-performance, portable C++ library providing data structures and algorithms for manipulating signed, arbitrary length integers, and for vectors, matrices, and polynomials over the integers and over finite fields.

Website: http://www.shoup.net/ntl/

License

• GNU LGPLv2.1+

Upstream Contact

• Victor Shoup - for contact info see http://www.shoup.net/

Special Update/Build Instructions

• None
External Packages, Release 10.0

Type

standard

Dependencies

- $(MP_LIBRARY)
- $gf2x: Fast arithmetic in $GF(2)[x]$ and searching for irreducible/primitive trinomials

Version Information

package-version.txt:

11.4.3

Equivalent System Packages

conda:

$ conda install ntl

cygwin:

$ apt-cyg install libntl-devel

Debian/Ubuntu:

$ sudo apt-get install libntl-dev

Fedora/Redhat/CentOS:

$ sudo yum install ntl-devel

freebsd:

$ sudo pkg install math/ntl

gentoo:

$ sudo emerge dev-libs/ntl

homebrew:

$ brew install ntl

macports: install the following packages: ntl

nix:

$ nix-env --install ntl

opensuse:
External Packages, Release 10.0

$ sudo zypper install ntl-devel

void:

$ sudo xbps-install ntl-devel

See https://repology.org/project/ntl/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.225 numpy: Package for scientific computing with Python

Description
This package adds numerical linear algebra and other numerical computing capabilities to python.

Upstream Contact

• https://numpy.org/
• Travis Oliphant
• Fernando Perez
• Brian Granger

Special Update/Build Instructions

• Scipy uses numpy’s distutils to control its compilation of fortran code.
  Whenever numpy is updated it is necessary to make sure that scipy still builds ok.

Type

standard

Dependencies

• $(PYTHON)
• $(BLAS)
  • gfortran: Fortran compiler from the GNU Compiler Collection
• $(PYTHON_TOOLCHAIN)
  • pkgconfig: Python interface to pkg-config
• cython: C-Extensions for Python, an optimizing static compiler

4.1. Details of external packages 309
**Version Information**

package-version.txt:

1.23.5

install-requires.txt:

numpy >=1.19

**Equivalent System Packages**

conda:

$ conda install numpy

homebrew:

$ brew install numpy

macports: install the following packages: py-numpy

void:

$ sudo xbps-install python3-numpy

See [https://repology.org/project/python:numpy/versions](https://repology.org/project/python:numpy/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/oneapi-src/oneTBB)

### 4.1.226 onetbb: oneAPI Threading Building Blocks

**Description**

C++ parallelization library

**License**

Apache License, Version 2.0

**Upstream Contact**

[https://github.com/oneapi-src/oneTBB](https://github.com/oneapi-src/oneTBB)
Type
optional

Dependencies

- cmake: A cross-platform build system generator

Version Information

package-version.txt:

2021.7.0

Equivalent System Packages

alpine: install the following packages: libtbb-dev
arch:

$ sudo pacman -S intel-oneapi-tbb

conda:

$ conda install tbb

Debian/Ubuntu:

$ sudo apt-get install libtbb-dev

Fedora/Redhat/CentOS:

$ sudo yum install tbb-devel

freebsd:

$ sudo pkg install devel/onetbb

gentoo:

$ sudo emerge dev-cpp/tbb

homebrew:

$ brew install tbb

macports: install the following packages: onetbb

nix:

$ nix-env --install tbb

void:
$ sudo xbps-install tbb-devel

If the system package is installed, ./configure will check whether it can be used.

4.1.227 openblas: An optimized implementation of BLAS (Basic Linear Algebra Subprograms)

Description

OpenBLAS is an optimized open library implementing the Basic Linear Algebra Subprograms (BLAS) specification. It is based on GotoBLAS2 1.13 BSD version.

License

3-clause BSD license

SPKG Repository

https://www.openblas.net
GitHub page: https://github.com/xianyi/OpenBLAS
Releases: https://github.com/xianyi/OpenBLAS/releases

Upstream Contact

- OpenBLAS users mailing list:
  https://groups.google.com/forum/#!forum/openblas-users
- OpenBLAS developers mailing list:
  https://groups.google.com/forum/#!forum/openblas-dev

Type

standard

Dependencies

- gfortran: Fortran compiler from the GNU Compiler Collection
Version Information

package-version.txt:

0.3.21

Equivalent System Packages

arch:

$ sudo pacman -S openblas lapack cblas

conda:

$ conda install openblas blas=2.*=openblas

cygwin:

$ apt-cyg install liblapack-devel libopenblas

Debian/Ubuntu:

$ sudo apt-get install libopenblas-dev

Fedora/Redhat/CentOS:

$ sudo yum install openblas-devel

freebsd:

$ sudo pkg install math/openblas

gentoo:

$ sudo emerge sci-libs/openblas

homebrew:

$ brew install openblas

macports: install the following packages: OpenBLAS-devel

nix:

$ nix-env --install blas lapack

opensuse:

$ sudo zypper install openblas-devel

void:

$ sudo xbps-install openblas-devel

See https://repology.org/project/openblas/versions

If the system package is installed, ./configure will check whether it can be used.

4.1. Details of external packages
4.1.228 openssl: Implementation of the SSL and TLS protocols

Description

From wikipedia: OpenSSL is an open source implementation of the SSL and TLS protocols. The core library (written in the C programming language) implements the basic cryptographic functions and provides various utility functions. Wrappers allowing the use of the OpenSSL library in a variety of computer languages are available.

License

- Apache License v2 (considered compatible with GPL v3)

Upstream Contact

- http://openssl.org/

Type

standard

Dependencies

Version Information

package-version.txt:

3.0.8

Equivalent System Packages

alpine: install the following packages: openssl-dev

arch:

$ sudo pacman -S openssl

conda:

$ conda install openssl

cygwin:

$ apt-cyg install libssl-devel

Debian/Ubuntu:

$ sudo apt-get install openssl libssl-dev

Fedora/Redhat/CentOS:
$ sudo yum install openssl openssl-devel

tomcat:
$ sudo apt-get install openssl

homebrew:
$ brew install openssl

macports: install the following packages: openssl
nix:
$ nix-env --install openssl

opensuse:
$ sudo zypper install libopenssl-3-devel

slackware:
$ sudo slackpkg install openssl openssl-solibs

void:
$ sudo xbps-install openssl-devel

See https://repology.org/project/openssl/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.229 ore_algebra: Ore algebra

Description
A Sage implementation of Ore algebras, Ore polynomials, and differentially finite functions.

Main features for the most common algebras include basic arithmetic and actions; gcrd and lclm; D-finite closure properties; creative telescoping; natural transformations between related algebras; guessing; desingularization; solvers for polynomials, rational functions and (generalized) power series. Univariate differential operators also support the numerical computation of analytic solutions with rigorous error bounds and related features.

License

- GPL-2.0+
Upstream Contact

- Website: https://github.com/mkauers/ore_algebra/
- Sage accounts: mkauers, mmezzarobba

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- $(SAGERUNTIME)

Version Information

requirements.txt:

```
git+https://github.com/mkauers/ore_algebra@01c357f590685ff362c008229681ee08269457da
#egg=ore_algebra
```

Equivalent System Packages

See https://repology.org/project/ore-algebra/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.230 osqp_python: The Operator Splitting QP Solver (Python wrapper)

Description

This is the Python wrapper for OSQP: The Operator Splitting QP Solver.

It vendors OSQP.

License

Apache 2.0
Upstream Contact

https://pypi.org/project/osqp/

Type

optional

Dependencies

- $(PYTHON)
- qdldl_python: QDLDL, a free LDL factorization routine (Python wrapper)
- numpy: Package for scientific computing with Python
- scipy: Scientific tools for Python
- $(PYTHON_TOOLCHAIN)
- cmake: A cross-platform build system generator

Version Information

package-version.txt:

0.6.2.post8

install-requires.txt:

osqp

Equivalent System Packages

conda:

$ conda install osqp

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.231 p_group_cohomology: Modular cohomology rings of finite groups

Description

Modular Cohomology Rings of Finite Groups

The package is located at http://users.fmi.uni-jena.de/cohomology/, that’s to say the tarball p_group_cohomology-x.y.tar.xz can be found there and the documentation of the package is provided at http://users.fmi.uni-jena.de/cohomology/documentation/
License

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David J. Green <david.green@uni-jena.de>

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The full text of the GPL is available at:

http://www.gnu.org/licenses/

The package includes a data base of cohomology rings of the groups of order 64 and provides access to a data base of cohomology rings of the groups of order 128 and 243, located at

http://cohomology.uni-jena.de/db/

These data bases are distributed under the Creative Commons Attribution-Share Alike 3.0 License. The full text of this licence is available at

http://creativecommons.org/licenses/by-sa/3.0/

SPKG Maintainers

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Upstream Contact

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We thank William Stein for giving us access to various computers on which we could build test the SPKG and on which some huge computations could be completed, and acknowledge the support by National Science Foundation Grant No. DMS-0821725.

We thank Mathieu Dutour Sikirić for hints on how to use GAP more efficiently.

We owe Peter Symonds the idea of using the Poincaré series in a rather efficient completeness criterion.

We are grateful to John Palmieri for his help on making p_group_cohomology work with python-3.
Dependencies

• The SharedMeatAxe needs to be installed, as a build time dependency.
  This can be met by installing the meataxe spkg

Testing

Our package provides a very short test suite for David Green’s routines for the computation of minimal projective resolutions. The majority of this package’s tests is formed by doc tests in the Cython code. In fact, any class, method and function is covered by tests.

Note that internet access is required for these tests, as it is attempted to download cohomology rings from a public data base in the web.

The script spkg-check calls sage -t --force_lib on the files in pGroupCohomology.

Documentation

The documentation of this package is automatically built, if the environment variable SAGE_SPKG_INSTALL_DOCS is yes (do “export SAGE_SPKG_INSTALL_DOCS=yes” on the command line before installation). The documents are put into SAGE_ROOT/local/share/doc/p_group_cohomology/.

Type

optional

Dependencies

• $(PYTHON)

• cython: C-Extensions for Python, an optimizing static compiler

• cysignals: Interrupt and signal handling for Cython

• singular: Computer algebra system for polynomial computations, algebraic geometry, singularity theory

• meataxe: Library for computing with modular representations

• p_group_cohomology: Modular cohomology rings of finite groups

• $(PYTHON_TOOLCHAIN)

• matplotlib: Python 2D plotting library

• gap: Groups, Algorithms, Programming - a system for computational discrete algebra

• xz: General-purpose data compression software

• $(SAGERUNTIME)

• ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
Version Information

package-version.txt:

3.3.3.p1

install-requires.txt:

p_group_cohomology >=3.3

Equivalent System Packages

See https://repology.org/project/sagemath-p-group-cohomology/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.232 packaging: Core utilities for Python packages

Description

Core utilities for Python packages

Type

standard

Dependencies

- $(PYTHON)
- setuptools: Build system for Python packages
- pip: Tool for installing and managing Python packages
- wheel: A built-package format for Python
- pyparsing: A Python parsing module
- setuptools_wheel: Build the setuptools package as a wheel

Version Information

package-version.txt:

21.3

install-requires.txt:

packaging >=18.0

# Trac #30975: packaging 20.5 is known to work but we have to silence → "DeprecationWarning: Creating a LegacyVersion"
**Equivalent System Packages**

conda:

```
$ conda install packaging
```

macports: install the following packages: py-packaging

void:

```
$ sudo xbps-install python3-packaging
```

See [https://repology.org/project/packaging/versions](https://repology.org/project/packaging/versions), [https://repology.org/project/python:packaging/versions](https://repology.org/project/python:packaging/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.233 palettable: Color palettes for Python

**Description**

Color palettes for Python

**License**

**Upstream Contact**

[https://pypi.org/project/palettable/](https://pypi.org/project/palettable/)

**Type**

optional

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
3.3.0
```

install-requires.txt:

```
palettable
```
Equivalent System Packages

conda:

```
$ conda install palettable
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.234 palp: A package for Analyzing Lattice Polytopes

Description

A Package for Analyzing Lattice Polytopes (PALP) is a set of C programs for calculations with lattice polytopes and applications to toric geometry.

It contains routines for vertex and facet enumeration, computation of incidences and symmetries, as well as completion of the set of lattice points in the convex hull of a given set of points. In addition, there are procedures specialised to reflexive polytopes such as the enumeration of reflexive subpolytopes, and applications to toric geometry and string theory, like the computation of Hodge data and fibration structures for toric Calabi-Yau varieties. The package is well tested and optimised in speed as it was used for time consuming tasks such as the classification of reflexive polyhedra in 4 dimensions and the creation and manipulation of very large lists of 5-dimensional polyhedra.

While originally intended for low-dimensional applications, the algorithms work in any dimension and our key routine for vertex and facet enumeration compares well with existing packages.

License

- When released, GPL 2 was in force.
- There is a link to a web page, which now points to GPL 3, but would have pointed to GPL 2 at the time the package was released.
- Therefore one can deduce the authors were happy for this to be released under GPL 2 or a later version.

Upstream Contact

- Author: Harald Skarke (skarke@maths.ox.ac.uk)
- Home page: http://hep.itp.tuwien.ac.at/~kreuzer/CY/CYpalp.html

Type

standard
Dependencies

Version Information

package-version.txt:

2.11

Equivalent System Packages

arch:

$ sudo pacman -S palp

conda:

$ conda install palp

Debian/Ubuntu:

$ sudo apt-get install palp

Fedora/Redhat/CentOS:

$ sudo yum install palp

nix:

$ nix-env --install palp

void:

$ sudo xbps-install palp

See https://repology.org/project/palp/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.235 pandoc: A document converter

Description

This script package represents the document converter pandoc.

We do not have an SPKG for it. The purpose of this script package is to associate system package lists with it.
External Packages, Release 10.0

Type
optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: pandoc
arch:
$ sudo pacman -S pandoc

conda:
$ conda install pandoc

Debian/Ubuntu:
$ sudo apt-get install pandoc

Fedora/Redhat/CentOS:
$ sudo yum install pandoc

freebsd:
$ sudo pkg install textproc/hs-pandoc

gentoo:
$ sudo emerge app-text/pandoc

homebrew:
$ brew install pandoc

macports: install the following packages: pandoc
opensuse:
$ sudo zypper install pandoc

void:
$ sudo xbps-install pandoc

See https://repology.org/project/pandoc/versions
If the system package is installed, ./configure will check whether it can be used.
4.1.236 pandoc_attributes: A parser and generator for pandoc block attributes

Description

This is a simple parser / emitter for pandoc block attributes, intended for use with pandocfilters.

License

BSD 2-Clause License

Upstream Contact

- Author: Aaron O’Leary
- Home page: https://github.com/aaren/pandoc-attributes

Special Update/Build Instructions

There are no release numbers, hence find the latest commit, download https://github.com/aaren/pandoc-attributes/archive/${COMMIT}.zip and rename it pandoc_attributes-${COMMIT:0:8}.zip

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- pip: Tool for installing and managing Python packages
- pandocfilters: A Python module for writing pandoc filters

Version Information

package-version.txt:

8bc82f6d

install-requires.txt:

pandoc_attributes >=8bc82f6d
**Equivalent System Packages**

conda:

```
$ conda install pandoc-attributes
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.237 pandocfilters: A Python module for writing pandoc filters

**Description**

A python module for writing pandoc filters.

**License**

BSD 3-Clause License

**Upstream Contact**

Author: John MacFarlane Home page: https://github.com/jgm/pandocfilters

**Special Update/Build Instructions**

Download the last release from https://pypi.python.org/pypi/pandocfilters

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
1.5.0
```

install-requires.txt:

```
pandocfilters >=1.4.2
```
**Equivalent System Packages**

conda:

```
$ conda install pandocfilters
```

macports: install the following packages: py-pandocfilters

void:

```
$ sudo xbps-install python3-pandocfilters
```

See [https://repology.org/project/python:pandocfilters/versions](https://repology.org/project/python:pandocfilters/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/scipopt/papilo/)

### 4.1.238 papilo: Parallel presolve for integer and linear optimization

**Description**

Parallel presolve routines for (mixed integer) linear programming problems. The routines are implemented using templates which allows switching to higher precision or rational arithmetic using the boost multiprecision package.

**License**

LGPL 3.0

**Upstream Contact**

[https://github.com/scipopt/papilo/](https://github.com/scipopt/papilo/)

**Type**

optional

**Dependencies**

- $(MP_LIBRARY)
- **boost_cropped**: Portable C++ libraries (subset needed for Sage)
- **onetbb**: oneAPI Threading Building Blocks
- $(BLAS)
- **gfortran**: Fortran compiler from the GNU Compiler Collection
- **cmake**: A cross-platform build system generator
Version Information

package-version.txt:

2.1.1

Equivalent System Packages

(none known)

4.1.239 pari: Computer algebra system for fast computations in number theory

Description

PARI/GP is a widely used computer algebra system designed for fast computations in number theory (factorizations, algebraic number theory, elliptic curves...), but also contains a large number of other useful functions to compute with mathematical entities such as matrices, polynomials, power series, algebraic numbers etc., and a lot of transcendental functions. PARI is also available as a C library to allow for faster computations.

Originally developed by Henri Cohen and his co-workers (Université Bordeaux I, France), PARI is now under the GPL and maintained by Karim Belabas with the help of many volunteer contributors.

License

GPL version 2+

Upstream Contact

- http://pari.math.u-bordeaux.fr/

Dependencies

- Perl
- MPIR or GMP
- Readline
- GNU patch (shipped with Sage)

Special Update/Build Instructions

See patches/README.txt for a list of patches.

The current upstream tarball was created from the PARI git repository by running “make snapshot”.

Type
standard

Dependencies

- `readline`: Command line editing library
- `${MP_LIBRARY}`
- `pari_galdata`: PARI data package needed to compute Galois groups in degrees 8 through 11
- `pari_seadata_small`: PARI data package needed by ellap for large primes (small version)

Version Information

`package-version.txt`

```
2.15.2.p1
```

Equivalent System Packages

**arch:**

```
$ sudo pacman -S pari pari-galdata pari-seadata pari-elldata pari-galpol
```

**conda:**

```
$ conda install pari=*=*_pthread pari-elldata pari-galdata pari-galpol pari-seadata
```

**Debian/Ubuntu:**

```
$ sudo apt-get install pari-gp2c libpari-dev pari-doc pari-elldata pari-galdata pari-galpol pari-seadata
```

**Fedora/Redhat/CentOS:**

```
$ sudo yum install pari-devel pari-gp --setopt=tsflags= pari-galdata pari-galpol pari-seadata pari-elldata
```

**freebsd:**

```
$ sudo pkg install math/pari
```

**gentoo:**

```
$ sudo emerge sci-mathematics/pari sci-mathematics/pari-data
```

**homebrew:**

```
$ brew install pari pari-elldata pari-galdata pari-galpol pari-seadata
```

**macports:** install the following packages: pari

**nix:**

```
```

4.1. Details of external packages
$ nix-env --install pari

opensuse:

$ sudo zypper install pari-devel pari-gp

void:

$ sudo xbps-install pari pari-devel pari-elldata-small pari-galdata pari-galpol-small pari-seadata


If the system package is installed, ./configure will check whether it can be used.

4.1.240 pari_elldata: PARI data package for elliptic curves

Description

PARI/GP version of J. E. Cremona Elliptic Curve Data, needed by ellsearch and ellidentify.

License

GNU General Public License (GPL version 2 or any later version).

Upstream Contact

http://pari.math.u-bordeaux.fr/

Dependencies

- Installation: None
- Runtime: PARI/GP

Type

optional
Dependencies

Version Information

package-version.txt:

20161017

Equivalent System Packages

arch:

$ sudo pacman -S pari-elldata

conda:

$ conda install pari-elldata

freebsd:

$ sudo pkg install math/pari_elldata

opensuse:

$ sudo zypper install pari-elldata

void:

$ sudo xbps-install pari-elldata-small

See https://repology.org/project/pari-elldata/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.241 pari_galdata: PARI data package needed to compute Galois groups in degrees 8 through 11

Description

PARI package "galdata": Needed by polgalois to compute Galois group in degrees 8 through 11.

License

GPL version 2+
Upstream Contact

http://pari.math.u-bordeaux.fr/

Type

standard

Dependencies

Version Information

package-version.txt:

20080411.p@

Equivalent System Packages

arch:

$ sudo pacman -S pari-galdata

conda:

$ conda install pari-galdata

Fedora/Redhat/CentOS:

$ sudo yum install pari-galdata

freebsd:

$ sudo pkg install pari_galdata

opensuse:

$ sudo zypper install pari-galdata

void:

$ sudo xbps-install pari-galdata

See https://repology.org/project/pari-galdata/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.242 pari_galpol: PARI data package for polynomials defining Galois extensions of the rationals

Description

PARI package of the GALPOL database of polynomials defining Galois extensions of the rationals, accessed by galoisgetpol, galoisgetgroup, galoisgetname.

License

GNU General Public License (GPL version 2 or any later version).

Upstream Contact

http://pari.math.u-bordeaux.fr/

Dependencies

- Installation: None
- Runtime: PARI/GP

Type

optional

Equivalent System Packages

arch:

$ sudo pacman -S pari-galpol

conda:

$ conda install pari-galpol

Fedora/Redhat/CentOS:

$ sudo yum install pari-galpol

freebsd:
$ sudo pkg install math/pari_galpol

opensuse:

$ sudo zypper install pari-galpol

void:

$ sudo xbps-install pari-galpol-small

See https://repology.org/project/pari-galpol/versions
If the system package is installed, ./configure will check whether it can be used.

### 4.1.243 pari_jupyter: A Jupyter kernel for PARI/GP

**Description**

A Jupyter kernel for PARI/GP

**License**

GPL version 3 or later

**Upstream Contact**

- https://github.com/sagemath/pari-jupyter

**Dependencies**

- Python >= 3.6.1
- Jupyter 4
- PARI version 2.13 or later
- Readline (any version which works with PARI)
- Optional: Cython version 0.25 or later

**Type**

optional
Dependencies

- $(PYTHON)
- pari: Computer algebra system for fast computations in number theory
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
- notebook: Jupyter notebook, a web-based notebook environment for interactive computing
- jupyter_core: Jupyter core package

Version Information

package-version.txt:

```
1.4.0
```

install-requires.txt:

```
pari_jupyter >=1.3.2
```

Equivalent System Packages

conda:

```
$ conda install pari_jupyter
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.244 pari_nftables: PARI data package for number fields

Description

Repackaging of the historical megrez number field tables (errors fixed, 1/10th the size, easier to use).

License

GNU General Public License (GPL version 2 or any later version).
External Packages, Release 10.0

Upstream Contact

http://pari.math.u-bordeaux.fr/

Dependencies

- Installation: None
- Runtime: PARI/GP

Type

optional

Dependencies

Version Information

package-version.txt:

20080929

Equivalent System Packages

conda:

$ conda install pari-nftables

freebsd:

$ sudo pkg install math/pari_nftables

opensuse:

$ sudo zypper install pari-nftables

void:

$ sudo xbps-install pari-nftables

See https://repology.org/project/pari-nftables/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.245 pari_seadata: PARI data package needed by ellap for large primes (full version)

Description

Needed by ellap for large primes. These polynomials were extracted from the ECHIDNA databases and computed by David R. Kohel. This covers finite fields of cardinality q up to 750 bits. PARI/GP 2.9 contains fallback code to go on when all modular polynomials in the database have been exhausted and can handle larger fields (with an important slowdown).

License

GNU General Public License (GPL version 2 or any later version).

Upstream Contact

http://pari.math.u-bordeaux.fr/

Dependencies

• Installation: None
• Runtime: PARI/GP

Type

optional

Dependencies

Version Information

package-version.txt:

| 20090618 |

Equivalent System Packages

arch:

$ sudo pacman -S pari-seadata

conda:

$ conda install pari-seadata

Fedora/Redhat/CentOS:

$ sudo yum install pari-seadata
freebsd:

```
$ sudo pkg install math/pari_seadata
```

opensuse:

```
$ sudo zypper install pari-seadata
```

void:

```
$ sudo xbps-install pari-seadata
```


If the system package is installed, `./configure` will check whether it can be used.

**4.1.246 pari_seadata_small: PARI data package needed by ellap for large primes (small version)**

**Description**

PARI package “seadata_small”: Needed by ellap for large primes. This “small” one is a much smaller version that should be suitable for primes up to 350 bits. These polynomials were extracted from the ECHIDNA databases and computed by David R. Kohel.

**License**

GPL version 2+

**Upstream Contact**

http://pari.math.u-bordeaux.fr/

**Type**

standard

**Dependencies**

**Version Information**

package-version.txt:

```
20090618.p0
```
Equivalent System Packages

arch:

$ sudo pacman -S pari-seadata

conda:

$ conda install pari-seadata-small

freebsd:

$ sudo pkg install math/pari_seadata

void:

$ sudo xbps-install pari-seadata

See https://repology.org/project/pari-seadata-small/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.247 parso: A Python parser

Description

Parso is a Python parser that supports error recovery and round-trip parsing for different Python versions (in multiple Python versions). Parso is also able to list multiple syntax errors in your python file.

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.8.3

install-requires.txt:

parso >=0.7.0
Equivalent System Packages

conda:

$ conda install parso

macports: install the following packages: py-parso

void:

$ sudo xbps-install python3-parso

See https://repology.org/project/python:parso/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.248 patch: Applies diffs and patches to files

Description

‘patch’ takes a patch file containing a difference listing produced by the ‘diff’ program and applies those differences to one or more original files, producing patched versions.

The version of ‘patch’ included is the GNU one. Some of the ‘diff’ files produced by GNU ‘diff’ are not acceptable to some versions of the ‘patch’ command, such as the ‘patch’ command that comes with Solaris.

License

This program is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2, or (at your option) any later version.

Upstream Contact

Main web site: http://savannah.gnu.org/projects/patch/

Bug database: http://savannah.gnu.org/bugs/?group=patch

Submit bugs: http://savannah.gnu.org/bugs/?func=additem&group=patch

Mailing lists: bug-patch@gnu.org

Special Update/Build Instructions

In the event patches ever need to be made to this package, the method of applying the patches should not rely on the ‘patch’ existing on the system.
Type

standard

Dependencies

Version Information

package-version.txt:

2.7.5

Equivalent System Packages

arch:

$ sudo pacman -S patch

conda:

$ conda install patch

cygwin:

$ apt-cyg install patch

Debian/Ubuntu:

$ sudo apt-get install patch

Fedora/Redhat/CentOS:

$ sudo yum install patch

freebsd:

$ sudo pkg install devel/patch

homebrew:

$ brew install gpatch

macports: install the following packages: gpatch

opensuse:

$ sudo zypper install patch

slackware:

$ sudo slackpkg install patch

void:
$ sudo xbps-install patch

See https://repology.org/project/patch/versions
If the system package is installed, ./configure will check whether it can be used.

**4.1.249 patchelf: A small utility to modify the dynamic linker and RPATH of ELF executables**

**Description**
A small utility to modify the dynamic linker and RPATH of ELF executables.

**License**
GPL-3.0-or-later

**Upstream Contact**
https://github.com/NixOS/patchelf

**Type**
standard

**Dependencies**
- *bzip2: High-quality data compressor*

**Version Information**
package-version.txt:

```
0.13.1
```

**Equivalent System Packages**

*(none known)*
4.1.250 pathspec: Utility library for gitignore style pattern matching of file paths.

Description
Utility library for gitignore style pattern matching of file paths.

License
MPL 2.0

Upstream Contact
https://pypi.org/project/pathspec/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
0.10.2

install-requires.txt:
pathspec

Equivalent System Packages
conda:
$ conda install pathspec

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.251 pdf2svg - PDF to SVG convertor

Description

pdf2svg is a tiny command-line utility using Cairo and Poppler to convert PDF documents into SVG files. Multi-page PDF can be split up to one SVG per page by passing a file naming specification.

License

GPL

Upstream Contact

http://cityinthesky.co.uk/opensource/pdf2svg/

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: pdf2svg
arch:

```bash
$ sudo pacman -S pdf2svg
```

conda:

```bash
$ conda install pdf2svg
```

Debian/Ubuntu:

```bash
$ sudo apt-get install pdf2svg
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install pdf2svg
```

freebsd:

```bash
$ sudo pkg install graphics/pdf2svg
```

homebrew:

```bash
$ brew install pdf2svg
```
macports: install the following packages: pdf2svg

nix:

```
$ nix-env --install pdf2svg
```

opensuse:

```
$ sudo zypper install pdf2svg
```

See https://repology.org/project/pdf2svg/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.252 perl_cpan_polymake_prereq: Represents all Perl packages that are prerequisites for polymake

#### Description

This script package represents all Perl packages that are prerequisites for polymake.

#### License

Various free software licenses

#### Type

optional

#### Dependencies

#### Version Information

#### Equivalent System Packages

cpan:

```
$ cpan -i XML::Writer XML::LibXML XML::LibXSLT File::Slurp JSON SVG Term::ReadKey
```

Debian/Ubuntu:

```
$ sudo apt-get install libxml-libxslt-perl libxml-writer-perl libxml2-dev libperl-dev ...
   libfile-slurp-perl libjson-perl libsvg-perl libterm-readkey-perl libterm-readline-gnu ...
   perl
```

Fedora/Redhat/CentOS:

```
$ sudo yum install perl-ExtUtils-Embed perl-File-Slurp perl-JSON perl-Term-ReadLine-Gnu ...
   perl-TermReadKey perl-XML-Writer perl-XML-LibXML perl-XML-LibXSLT
```

freebsd:
4.1.253 perl_mongodb: A prerequisite for polymake's PolyDB feature

Description

This script package represents the Perl package MongoDB, which is needed for the PolyDB feature of polymake.

License

Various free software licenses

Type

optional

Dependencies

Version Information

Equivalent System Packages

cpan:

$ cpan -i MongoDB

Debian/Ubuntu:

$ sudo apt-get install libmongodb-perl

Fedora/Redhat/CentOS:

$ sudo yum install perl-MongoDB

freebsd:

$ sudo pkg install databases/p5-MongoDB
gentoo:

```
$ sudo emerge dev-perl/MongoDB
```

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.254 perl_term_readline_gnu: Perl extension for the GNU Readline/History libraries

**Description**

Perl extension for the GNU Readline/History Library

Available on CPAN

**License**

The Perl 5 License (Artistic 1 & GPL 1)

**Upstream Contact**

Hiroo HAYASHI

**Type**

optional

**Dependencies**

- `readline`: Command line editing library

**Version Information**

package-version.txt:

```
1.35
```

**Equivalent System Packages**

arch:

```
$ sudo pacman -S perl-term-readline-gnu
```

cpan:

```
$ cpan -i Term::ReadLine::Gnu
```

cygwin:

```
```

### 4.1. Details of external packages
$ apt-cyg install perl-Term-ReadLine-Gnu

Debian/Ubuntu:

$ sudo apt-get install libterm-readline-gnu-perl

Fedora/Redhat/CentOS:

$ sudo yum install perl-Term-ReadLine-Gnu

devils:

$ sudo pkg install devel/p5-Term-ReadLine-Gnu

gentoo:

$ sudo emerge dev-perl/Term-ReadLine-Gnu

macports: install the following packages: p5-term-readline-gnu

opensuse:

$ sudo zypper install "perl(Term::ReadLine::Gnu)"

void:

$ sudo xbps-install perl-Term-ReadLine-Gnu


If the system package is installed, ./configure will check whether it can be used.

4.1.255 pexpect: Python module for controlling and automating other programs

Description

Pexpect is a pure Python module for spawning child applications; controlling them; and responding to expected patterns in their output.

License

ISC license: http://opensource.org/licenses/isc-license.txt This license is approved by the OSI and FSF as GPL-compatible.
Upstream Contact

- https://github.com/pexpect/pexpect

Type

standard

Dependencies

- ${PYTHON}
- ptyprocess: Python interaction with subprocesses in a pseudoterminal
- ${PYTHON_TOOLCHAIN}

Version Information

package-version.txt:

```
4.8.0
```

install-requires.txt:

```
pexpect >=4.8.0
```

Equivalent System Packages

conda:

```
$ conda install pexpect
```

macports: install the following packages: py-pexpect

opensuse:

```
$ sudo zypper install python3-pexpect
```

void:

```
$ sudo xbps-install python3-pexpect
```

See https://repology.org/project/pexpect/versions, https://repology.org/project/python:pexpect/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1. Details of external packages
4.1.256 phitigra: A graph editor for SageMath/Jupyter

Description
A graph editor for SageMath/Jupyter

License

Upstream Contact
https://pypi.org/project/phitigra/

Type
optional

Dependencies
- $(PYTHON)
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
- pillow: Python Imaging Library
- numpy: Package for scientific computing with Python
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

| phitigra| =| 0.2.6 |

Equivalent System Packages

(none known)

4.1.257 pickleshare: A ‘shelve’ like datastore with concurrency support

Description
PickleShare - a small ‘shelve’ like datastore with concurrency support
Like shelve, a PickleShareDB object acts like a normal dictionary. Unlike shelve, many processes can access the database simultaneously. Changing a value in database is immediately visible to other processes accessing the same database.

Concurrency is possible because the values are stored in separate files. Hence the “database” is a directory where all files are governed by PickleShare.
Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:
0.7.5

install-requires.txt:
pickleshare >=0.7.5

Equivalent System Packages

conda:
$ conda install pickleshare

macports: install the following packages: py-pickleshare
opensuse:
$ sudo zypper install python3-pickleshare
void:
$ sudo xbps-install python3-pickleshare

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.258 pillow: Python Imaging Library

Description

Pillow is the “friendly” PIL fork by Alex Clark and Contributors.
The Python Imaging Library (PIL) adds powerful image processing and graphics capabilities to Python. The library supports many file formats.
External Packages, Release 10.0

License

Standard PIL License

Upstream Contact

- Author: Alex Clark <aclark@aclark.net>
- https://python-pillow.org/
- Homepage: http://python-imaging.github.io/

Type

standard

Dependencies

- $(PYTHON)
- zlib: Data compression library
- freetype: A free, high-quality, and portable font engine
- $(PYTHON_TOOLCHAIN)
- pkgconf: An implementation of the pkg-config spec

Version Information

package-version.txt:

9.0.1

install-requires.txt:

pillow >=7.2.0

Equivalent System Packages

conda:

$ conda install pillow

macports: install the following packages: py-Pillow

opensuse:

$ sudo zypper install python3-Pillow

void:

$ sudo xbps-install python3-Pillow
See https://repology.org/project/python:pillow/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.259 pint: Physical quantities module

Description

Physical quantities module

License

BSD

Upstream Contact

https://pypi.org/project/Pint/

Type

optional

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.20.1

install-requires.txt:

Pint

Equivalent System Packages

conda:

$ conda install pint

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.260 pip: Tool for installing and managing Python packages

Description

This package installs pip, the tool for installing and managing Python packages, such as those found in the Python Package Index. It’s a replacement for easy_install.

License

MIT

Upstream Contact

- Project Page: https://github.com/pypa/pip
- Bug Tracking: https://github.com/pypa/pip/issues
- Mailing list: http://groups.google.com/group/python-virtualenv
- Docs: https://pip.pypa.io/

Type

standard

Dependencies

- $(PYTHON)
- setuptools: Build system for Python packages
- wheel: A built-package format for Python

Version Information

package-version.txt:

22.3.1

install-requires.txt:

pip >=21.3
# for use of the "in-tree-build" feature, default since 21.3, by the Sage distribution
**Equivalent System Packages**

*arch:*

```
$ sudo pacman -S python-pip
```

*conda:*

```
$ conda install pip
```

*macports: install the following packages: py-pip*

*opensuse:*

```
$ sudo zypper install python3-pip
```

*void:*

```
$ sudo xbps-install python3-pip
```

See [https://repology.org/project/pip3/versions](https://repology.org/project/pip3/versions), [https://repology.org/project/python:pip/versions](https://repology.org/project/python:pip/versions), [https://repology.org/project/python3x-pip/versions](https://repology.org/project/python3x-pip/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemATH2019/sage/issues/29023)

### 4.1.261 pkgconf: An implementation of the pkg-config spec

**Description**

Pkgconf is an implementation of the pkg-config spec with minimal dependencies.

**License**

ISC License (equivalent to Simplified BSD)

**Upstream Contact**

[https://github.com/pkgconf/pkgconf](https://github.com/pkgconf/pkgconf)

**Special Update/Build Instructions**

- `install.patch`: Use install script from `AC_PROG_INSTALL`

Pkgconf is used in bzip2, so we must not use the bzip2-compressed tarball.
Type
standard

Dependencies

- *patch*: Applies diffs and patches to files
- *xz*: General-purpose data compression software

Version Information

package-version.txt:

```
1.8.0
```

Equivalent System Packages

conda:

```
$ conda install pkg-config
```

Debian/Ubuntu:

```
$ sudo apt-get install pkg-config
```

Fedora/Redhat/CentOS:

```
$ sudo yum install pkg-config
```

freebsd:

```
$ sudo pkg install devel/pkgconf
```

homebrew:

```
$ brew install pkg-config
```

macports: install the following packages: pkgconfig

opensuse:

```
$ sudo zypper install pkgconf
```

void:

```
$ sudo xbps-install pkgconf
```

See https://repology.org/project/pkgconf/versions, https://repology.org/project/pkg-config/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.262 pkgconfig: Python interface to pkg-config

Description

Pkgconfig is a Python module to interface with the pkg-config command line tool.

License

MIT License

Upstream Contact

https://github.com/matze/pkgconfig

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- pkgconf: An implementation of the pkg-config spec
- poetry_core: Poetry PEP 517 Build Backend

Version Information

package-version.txt:

```
1.5.5
```

install-requires.txt:

```
pkgconfig >=1.5.1
```

Equivalent System Packages

conda:

```
$ conda install pkgconfig
```

macports: install the following packages: py-pkgconfig

opensuse:

```
$ sudo zypper install pkg-config
```

void:
$ sudo xbps-install python3-pkgconfig

See https://repology.org/project/python:pkgconfig/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.263 planarity: Planarity-related graph algorithms

#### Description

This code project provides a library for implementing graph algorithms as well as implementations of several planarity-related graph algorithms. The origin of this project is the reference implementation for the Edge Addition Planarity Algorithm [1], which is now the fastest and simplest linear-time method for planar graph embedding and planarity obstruction isolation (i.e. Kuratowski subgraph isolation).


#### License

New BSD License

#### Upstream Contact

- https://github.com/graph-algorithms/edge-addition-planarity-suite/
- John Boyer <John.Boyer.PhD@gmail.com>

#### Special Update/Build Instructions

The tarballs can be found at, https://github.com/graph-algorithms/edge-addition-planarity-suite/releases sage tarball is repackaged after running autogen.sh

#### Type

standard

#### Dependencies

#### Version Information

package-version.txt:

```
3.0.1.0
```
Equivalent System Packages

arch:

$ sudo pacman -S planarity

conda:

$ conda install planarity

Debian/Ubuntu:

$ sudo apt-get install libplanarity-dev planarity

Fedora/Redhat/CentOS:

$ sudo yum install planarity planarity-devel

freebsd:

$ sudo pkg install math/planarity

gentoo:

$ sudo emerge sci-mathematics/planarity

nix:

$ nix-env --install planarity

opensuse:

$ sudo zypper install edge-addition-planarity-suite edge-addition-planarity-suite-devel

void:

$ sudo xbps-install planarity-devel

See https://repology.org/project/planarity/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.264 plantri: Generate non-isomorphic sphere-embedded graphs

Description

Plantri is a program that generates certain types of graphs that are imbedded on the sphere.

Exactly one member of each isomorphism class is output, using an amount of memory almost independent of the number of graphs produced. This, together with the exceptionally fast operation and careful validation, makes the program suitable for processing very large numbers of graphs.

Isomorphisms are defined with respect to the embeddings, so in some cases outputs may be isomorphic as abstract graphs.
License

Plantri is distributed without a license.

Upstream Contact

Gunnar Brinkmann
  • University of Ghent
  • Gunnar.Brinkmann@ugent.be

Brendan McKay
  • Australian National University
  • bdm@cs.anu.edu.au

See http://cs.anu.edu.au/~bdm/plantri

Type

optional

Dependencies

Version Information

package-version.txt:

5.3

Equivalent System Packages

arch:

$ sudo pacman -S plantri

See https://repology.org/project/plantri/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.265 platformdirs: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.

Description

A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
License

Upstream Contact

https://pypi.org/project/platformdirs/

Type

standard

Dependencies

- $(PYTHON)
- setuptools_scm: Python build system extension to obtain package version from version control
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend
- hatch_vcs: Hatch plugin for versioning with your preferred VCS

Version Information

package-version.txt:

```
2.5.4
```

install-requires.txt:

```
platformdirs
```

Equivalent System Packages

conda:

```
$ conda install platformdirs
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.266 pluggy: plugin and hook calling mechanisms for python

Description

plugin and hook calling mechanisms for python
License

MIT license

Upstream Contact

https://pypi.org/project/pluggy/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.0.0

install-requires.txt:

pluggy

Equivalent System Packages

conda:

$ conda install pluggy

void:

$ sudo xbps-install python3-pluggy

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.267 ply: Python Lex & Yacc

Description

Python Lex & Yacc
License

BSD

Upstream Contact

https://pypi.org/project/ply/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.11

install-requires.txt:

ply

Equivalent System Packages

conda:

$ conda install ply

void:

$ sudo xbps-install python3-PLY

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.268 poetry_core: Poetry PEP 517 Build Backend

Description

Poetry PEP 517 Build Backend
License

MIT

Upstream Contact

https://pypi.org/project/poetry-core/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.0.8

install-requires.txt:

poetry-core

Equivalent System Packages

conda:

$ conda install poetry-core

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.269 polylib: Operations on unions of polyhedra

Description

The Polyhedral Library (PolyLib for short) operates on objects made up of unions of polyhedra of any dimension. polylib is a C library.
License

GPL v3

Upstream Contact

- https://groups.google.com/forum/#!forum/isl-development

Type

experimental

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- ntl: A library for doing number theory

Version Information

package-version.txt:

5.22.5

Equivalent System Packages

macports: install the following packages: polylib
opensuse:

$ sudo zypper install polylib "pkgconfig(polylibgmp)"

See https://repology.org/project/polylib/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.270 polymake: Computations with polyhedra, fans, simplicial complexes, matroids, graphs, tropical hypersurfaces

Description

polymake is open source software for research in polyhedral geometry. It deals with polytopes, polyhedra and fans as well as simplicial complexes, matroids, graphs, tropical hypersurfaces, and other objects. Supported platforms include various flavors of Linux, Free BSD and Mac OS.
License

- GPL v3

Upstream Contact

- https://polymake.org/

Dependencies

Polymake needs a working installation of Perl, including its shared library and some modules (XML::Writer, XML::LibXML, XML::LibXSLT, Term::ReadLine::Gnu, JSON, SVG). The Polymake interface in Sage additionally needs File::Slurp. For full functionality including polymake's polyDB, also the Perl module MongoDB is needed.

These are not provided by a Sage package. The script package perl_cpan_polymake_prereq will signal an error at build time if the required prerequisites are not met.

The configure script will inform you about the equivalent system packages that you should install. Otherwise, you can use CPAN (see below).

Sage might install the Term::ReadLine::Gnu module, however, when you install polymake, if it is not provided by the system, or if Sage installs its own readline library.

A distribution-independent way to install Perl modules (into a user’s home directory or /usr/local) is using CPAN. This is also the way to install the modules on macOS. For this, if you don’t have root access, you will need the local::lib Perl module installed:

```
cpan -i XML::Writer XML::LibXML XML::LibXSLT File::Slurp Term::ReadLine::Gnu JSON SVG
˓
→ MongoDB
```

Several Sage packages should be installed before installing the polymake package to give a more featureful Polymake installation:

```
sage -i 4ti2 latte_int topcom qhull
```

Software that would need to be installed manually (no Sage package available) for a more featureful Polymake installation: azove, porta, vinci, SplitsTree4.

Information on missing Polymake prerequisites after installing polymake:

```
$ sage -sh
(sage-sh) $ polymake
polytope> show_unconfigured;
```

In order to Polymake from Sage, you will need the JuPyMake:

```
sage -i jupymake
```
Debugging polymake install problems

```bash
# apt-get install libdevel-trace-perl
$ cd src
$ perl -d:Trace support/configure.pl
```

**Type**

optional

**Dependencies**

- $(MP_LIBRARY)
- bliss: Computing automorphism groups and canonical forms of graphs
- cddlib: Double description method for polyhedral representation conversion
- normaliz: Computations in affine monoids, vector configurations, lattice polytopes, and rational cones
- perl_term_readline_gnu: Perl extension for the GNU Readline/History libraries
- ppl: Parma Polyhedra Library
- perl_cpan_polymake_prereq: Represents all Perl packages that are prerequisites for polymake
- libxml2: XML parser and toolkit
- lrslib: Reverse search algorithm for vertex enumeration and convex hull problems
- ninja_build: A build system with a focus on speed

**Version Information**

package-version.txt:

4.9

**Equivalent System Packages**

arch:

```bash
$ sudo pacman -S polymake
```

Debian/Ubuntu:

```bash
$ sudo apt-get install polymake libpolymake-dev
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install polymake
```

homebrew:
$ brew install apaffenholz/polymake/polymake

nix:

$ nix-env --install polymake

opensuse:

$ sudo zypper install polymake

See https://repology.org/project/polymake/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.271 polytopes_db: Databases of 2- and 3-dimensional reflexive polytopes

Description

This package includes lists of 2- and 3-dimensional reflexive polytopes. The list of polygons is quite easy to get and it has been known for a while. The list of 3-polytopes was originally obtained by Maximilian Kreuzer and Harald Skarke using their software PALP, which is included into the standard distribution of Sage. To work with lattice and reflexive polytopes from Sage you can use sage.geometry.lattice_polytope module, which relies on PALP for some of its functionality. To get access to the databases of this package, use ReflexivePolytope and ReflexivePolytopes commands.

License

GPL

Upstream Contact

http://hep.itp.tuwien.ac.at/~kreuzer/CY/CYpalp.html

Type

standard

Dependencies

Version Information

package-version.txt:

20170220.p0
Equivalent System Packages

arch:

$ sudo pacman -S sage-data-polytopes_db

conda:

$ conda install sagemath-db-polytopes

See https://repology.org/project/sagemath-polytopes-db/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.272 polytopes_db_4d: Database of 4-dimensional reflexive polytopes

Description

This package contains the database of 4-d reflexive polytopes with Hodge numbers as index. Based on the original list by Maximilian Kreuzer and Harald Skarke using their software PALP.

License

GPL v2+

SPKG Maintainers

Volker Braun <vbraun.name@gmail.com>

Type

optional

Dependencies

Version Information

package-version.txt:

1.0
Equivalent System Packages

See https://repology.org/project/polytopes-db-4d/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.273 ppl: Parma Polyhedra Library

Description

The Parma Polyhedra Library (PPL) provides numerical abstractions especially targeted at applications in the field of analysis and verification of complex systems. These abstractions include convex polyhedra, defined as the intersection of a finite number of (open or closed) halfspaces, each described by a linear inequality (strict or non-strict) with rational coefficients; some special classes of polyhedra shapes that offer interesting complexity/precision tradeoffs; and grids which represent regularly spaced points that satisfy a set of linear congruence relations. The library also supports finite powersets and products of (any kind of) polyhedra and grids, a mixed integer linear programming problem solver using an exact-arithmetic version of the simplex algorithm, a parametric integer programming solver, and primitives for the termination analysis via the automatic synthesis of linear ranking functions.

It is written in C++, but comes with interfaces to C, Java, OCaml, and Prolog. PPL is one of the fastest implementations of polyhedral computations.

Benchmarks are included in this paper: arXiv cs/0612085

License

GPL v3+

Upstream Contact

- https://www.bugseng.com/ppl

Core Development Team

- Roberto Bagnara (University of Parma)
- Patricia M. Hill (University of Parma)
- Enea Zaffanella (University of Parma)

Type

standard
Dependencies

- $(MP_LIBRARY)
- $glpk: GNU Linear Programming Kit$

Version Information

package-version.txt:

1.2.p1

Equivalent System Packages

arch:

$ sudo pacman -S ppl

conda:

$ conda install ppl

Debian/Ubuntu:

$ sudo apt-get install libppl-dev ppl-dev

Fedora/Redhat/CentOS:

$ sudo yum install ppl ppl-devel

freebsd:

$ sudo pkg install devel/ppl

gentoo:

$ sudo emerge dev-libs/ppl

homebrew:

$ brew install ppl

macports: install the following packages: ppl

nix:

$ nix-env --install ppl

opensuse:

$ sudo zypper install ppl-devel

void:

4.1. Details of external packages
$ sudo xbps-install  ppl-devel

See https://repology.org/project/ppl/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.274  pplpy: Python interface to the Parma Polyhedra Library

Description

PPL Python wrapper
This Python package provides a wrapper to the C++ Parma Polyhedra Library (PPL).
The whole package started as a fork of a tiny part of the Sage software.

License

GPL version 3

Upstream Contact

• https://github.com/sagemath/pplpy

Type

standard

Dependencies

• $({PYTHON})
• $({MP_LIBRARY})
• gmpy2: Python interface to GMP/MPIR, MPFR, and MPC
• cysignals: Interrupt and signal handling for Cython
• mpfr: Multiple-precision floating-point computations with correct rounding
• mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
• ppl: Parma Polyhedra Library
• $({PYTHON_TOOLCHAIN})
• sphinx: Python documentation generator
**Version Information**

package-version.txt:

```
0.8.7
```

install-requires.txt:

```
# Trac #30922: pplpy 0.8.4 and earlier do not declare dependencies correctly
pplpy >=0.8.6
```

**Equivalent System Packages**

conda:

```
$ conda install pplpy
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.275 pplpy_doc: Python interface to the Parma Polyhedra Library (documentation)**

**Description**

PPL. Python wrapper (documentation)

**License**

GPL version 3

**Upstream Contact**

- https://github.com/sagemath/pplpy

**Type**

standard
Dependencies

- *pplpy: Python interface to the Parma Polyhedra Library*
- *sphinx: Python documentation generator*

Version Information

package-version.txt:

```
0.8.7
```

Equivalent System Packages

(none known)

4.1.276 primecount: Algorithms for counting primes

Description

primecount is a C++ implementation of several algorithms for counting primes maintained by Kim Walisch.

Website: https://github.com/kimwalisch/primecount/

License

primecount is licensed BSD 2

Upstream Contact

- https://github.com/kimwalisch/primecount/

Type

standard

Dependencies

- *primesieve: CLI program and C/C++ library for generating primes*
- *cmake: A cross-platform build system generator*
Version Information

package-version.txt:

7.6

Equivalent System Packages

arch:

$ sudo pacman -S primecount

conda:

$ conda install primecount

Fedora/Redhat/CentOS:

$ sudo yum install primecount primecount-devel

gentoo:

$ sudo emerge sci-mathematics/primecount

homebrew:

$ brew install primecount

opensuse:

$ sudo zypper install primecount libprimecount-devel

void:

$ sudo xbps-install primecount-devel

See https://repology.org/project/primecount/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.277 primecountpy: Cython interface for C++ primecount library

Description

Cython interface for C++ primecount library
License

GPLv3

Upstream Contact

https://pypi.org/project/primecountpy/

Type

standard

Dependencies

- $(PYTHON)
- primecount: Algorithms for counting primes
- cysignals: Interrupt and signal handling for Cython
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler

Version Information

package-version.txt:

0.1.0

install-requires.txt:

primecountpy

Equivalent System Packages

conda:

$ conda install primecountpy

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.278 primesieve: CLI program and C/C++ library for generating primes

Description

A CLI program and C/C++ library for quickly generating prime numbers. https://github.com/kimwalisch/primesieve
A dependency of the standard spkg primecount.

License

BSD-2-clause

Upstream Contact

- https://github.com/kimwalisch/primesieve

Type

standard

Dependencies

- cmake: A cross-platform build system generator

Version Information

package-version.txt:

```
11.0
```

Equivalent System Packages

alpine: install the following packages: primesieve-dev primesieve
arch:

```
$ sudo pacman -S primesieve
```

conda:

```
$ conda install primesieve
```

Debian/Ubuntu:

```
$ sudo apt-get install libprimesieve-dev
```

Fedora/Redhat/CentOS:

```
$ sudo yum install primesieve-devel primesieve
```

gentoo:

```
```
$ sudo emerge sci-mathematics/primesieve

homebrew:

$ brew install primesieve

opensuse:

$ sudo zypper install primesieve

void:

$ sudo xbps-install primesieve-devel

See https://repology.org/project/primesieve/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.279 prometheus_client: Python client for the systems monitoring and alerting toolkit Prometheus

Description

The official Python 2 and 3 client for Prometheus (see https://prometheus.io), an open-source systems monitoring and alerting toolkit.

Type

standard

Dependencies

• $(PYTHON)
  • $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.14.1

install-requires.txt:

prometheus_client >=0.8.0
Equivalent System Packages

conda:

```
$ conda install prometheus_client
```

macports: install the following packages: py-prometheus_client

opensuse:

```
$ sudo zypper install python3-prometheus_client
```

void:

```
$ sudo xbps-install python3-prometheus_client
```

See https://repology.org/project/python:prometheus-client/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.280 prompt_toolkit: Interactive command lines for Python

Description

Library for building powerful interactive command lines in Python

https://pypi.python.org/pypi/prompt_toolkit

Type

standard

Dependencies

- $(PYTHON)
- six: Python 2 and 3 compatibility utilities
- wcwidth: Measures the displayed width of unicode strings in a terminal
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.0.24

install-requires.txt:

```
# :issue:33428 - prompt_toolkit 3.0.25+ breaks Ctrl-C
prompt_toolkit >=3.0.5, <3.0.25
```
**Equivalent System Packages**

conda:

```
$ conda install prompt_toolkit
```

macports: install the following packages: py-prompt_toolkit

opensuse:

```
$ sudo zypper install python3-prompt_toolkit
```

void:

```
$ sudo xbps-install python3-prompt_toolkit
```

See [https://repology.org/project/python:prompt-toolkit/versions](https://repology.org/project/python:prompt-toolkit/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.281 ptyprocess: Python interaction with subprocesses in a pseudoterminal**

**Description**

Launch a subprocess in a pseudo terminal (pty), and interact with both the process and its pty.

Sometimes, piping stdin and stdout is not enough. There might be a password prompt that doesn’t read from stdin, output that changes when it’s going to a pipe rather than a terminal, or curses-style interfaces that rely on a terminal.

If you need to automate these things, running the process in a pseudo terminal (pty) is the answer.

**License**

Ptyprocess is under the ISC license, as code derived from Pexpect.

[http://opensource.org/licenses/ISC](http://opensource.org/licenses/ISC)

**Upstream Contact**

[https://github.com/pexpect/ptyprocess](https://github.com/pexpect/ptyprocess)

**Type**

standard
Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.5.1.p0

install-requires.txt:

ptyprocess ==0.5.1
# :issue:`31280` #comment:42 and following
# sagelib is not compatible with ptyprocess 0.5.2, 0.6, and 0.7

Equivalent System Packages

conda:
macports: install the following packages: py-ptyprocess
opensuse:

$ sudo zypper install python3-ptyprocess

void:

$ sudo xbps-install python3-ptyprocess

See https://repology.org/project/ptyprocess/versions, https://repology.org/project/python:ptyprocess/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.282 pure_eval: Safely evaluate AST nodes without side effects

Description

Safely evaluate AST nodes without side effects

License

MIT
External Packages, Release 10.0

Upstream Contact

https://pypi.org/project/pure-eval/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:
0.2.2

install-requires.txt:

pure-eval

Equivalent System Packages

conda:

$ conda install pure_eval

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.283 py: library with cross-python path, ini-parsing, io, code, log facilities

Description

library with cross-python path, ini-parsing, io, code, log facilities

License

MIT license
Upstream Contact

https://pypi.org/project/py/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- setuptools_scm: Python build system extension to obtain package version from version control

Version Information

package-version.txt:

1.11.0

install-requires.txt:

py

Equivalent System Packages

conda:

$ conda install py

void:

$ sudo xbps-install python3-py

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.284 pybind11: Create Python bindings to C++ code

Description

pybind11 is a lightweight header-only library that exposes C++ types in Python and vice versa, mainly to create Python bindings of existing C++ code. Its goals and syntax are similar to the excellent [Boost.Python](http://www.boost.org/doc/libs/1_58_0/libs/python/doc/) library by David Abrahams: to minimize boilerplate code in traditional extension modules by inferring type information using compile-time introspection.
License

pybind11 is provided under a BSD-style license that can be found in the LICENSE file. By using, distributing, or contributing to this project, you agree to the terms and conditions of this license.

Upstream Contact

https://github.com/pybind/pybind11

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.10.1

install-requires.txt:

pybind11 >=2.5.0

Equivalent System Packages

conda:

$ conda install pybind11

homebrew:

$ brew install pybind11

macports: install the following packages: py-pybind11

void:

$ sudo xbps-install python3-pybind11

See https://repology.org/project/python:pybind11/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.285 pybtex: A BibTeX-compatible bibliography processor in Python

Description

A BibTeX-compatible bibliography processor in Python

License

MIT

Upstream Contact

https://pypi.org/project/pybtex/

Type

optional

Dependencies

Version Information

requirements.txt:

pybtex

Equivalent System Packages

conda:

$ conda install pybtex

macports: install the following packages: py-pybtex

opensuse:

$ sudo zypper install python3-pybtex

See https://repology.org/project/python:pybtex/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.286 pycosat: SAT solver picosat with Python bindings

Description

PicoSAT is a popular SAT solver written by Armin Biere in pure C. This package provides efficient Python bindings to picosat on the C level, i.e. when importing pycosat, the picosat solver becomes part of the Python process itself. For ease of deployment, the picosat source (namely picosat.c and picosat.h) is included in this project. These files have been extracted from the picosat source.

License

MIT

Upstream Contact

- PicoSAT: http://fmv.jku.at/picosat/
- pycosat: https://github.com/ContinuumIO/pycosat

Special Update/Build Instructions

None.

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.6.3

install-requires.txt:

pycosat >=0.6.3
**Equivalent System Packages**

conda:

```
$ conda install pycosat
```

See [https://repology.org/project/pycosat/versions](https://repology.org/project/pycosat/versions), [https://repology.org/project/python:pycosat/versions](https://repology.org/project/python:pycosat/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/)

### 4.1.287 pycparser: Parser of the C language in Python

**Description**

development website: [https://github.com/eliben/pycparser](https://github.com/eliben/pycparser)

PyPI page: [https://pypi.org/project/pycparser/](https://pypi.org/project/pycparser/)

**License**

BSD

**Upstream Contact**

[https://github.com/eliben/pycparser](https://github.com/eliben/pycparser)

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
2.21
```

install-requires.txt:

```
pycparser >=2.20
```
Equivalent System Packages

conda:

$ conda install pycparser

macports: install the following packages: py-pycparser

opensuse:

$ sudo zypper install python3-pycparser

void:

$ sudo xbps-install python3-pycparser


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.288 pycryptosat: Python module of cryptominisat

Description

Build and install pycryptosat into appropriate venv. See cryptominisat for more details.

License

MIT License

Upstream Contact

- Authors: Mate Soos
- Email: soos.mate@gmail.com
- Website: http://www.msoos.org/
- Releases: https://github.com/msoos/cryptominisat/releases

Type

optional
Dependencies

- $(PYTHON)
- m4ri: fast arithmetic with dense matrices over GF(2)
- zlib: Data compression library
- libpng: Bitmap image support
- cryptominisat: A SAT solver
- cmake: A cross-platform build system generator
- boost_cropped: Portable C++ libraries (subset needed for Sage)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
5.8.0
```

install-requires.txt:

```
pycryptosat
```

Equivalent System Packages

conda:

```
$ conda install cryptominisat
```

homebrew:

```
$ brew install cryptominisat
```

See https://repology.org/project/cryptominisat/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.289 pycygwin: Python bindings for Cygwin’s C API

Description

Python bindings for Cygwin’s C API. Provides some utilities to help with the Cygwin port. Naturally, this package should only be installed on Cygwin—for other platforms its installation is a no-op.
Website

https://github.com/embray/PyCygwin

Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.1

install-requires.txt:

pycygwin >=0.1

Equivalent System Packages

See https://repology.org/project/python:pycygwin/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.290 pyflakes: Passive checker of Python programs

Description

passive checker of Python programs

License

MIT
Upstream Contact

https://pypi.org/project/pyflakes/

Type

optional

Dependencies

Version Information

requirements.txt:

pyflakes

Equivalent System Packages

conda:

$ conda install pyflakes

macports: install the following packages: py-pyflakes

opensuse:

$ sudo zypper install python3-pyflakes

void:

$ sudo xbps-install python3-pyflakes

See https://repology.org/project/pyflakes/versions, https://repology.org/project/python:pyflakes/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.291 pygments: Generic syntax highlighter

Description

Pygments is a syntax highlighting package written in Python.

It is a generic syntax highlighter suitable for use in code hosting, forums, wikis or other applications that need to prettify source code. Highlights are:

• a wide range of over 300 languages and other text formats is supported
• special attention is paid to details, increasing quality by a fair amount
• support for new languages and formats are added easily
• a number of output formats, presently HTML, LaTeX, RTF, SVG, all image formats that PIL supports and ANSI sequences
• it is usable as a command-line tool and as a library

License

Modified BSD

Upstream Contact

• Author: Georg Brandl
• Home Page: https://pygments.org

Special Update/Build Instructions

Patches included:

• sage_prompt.patch: patch pygments/lexers/agile.py to treat the "sage:" prompt like Python’s ">>>" prompt. This allows a very kludgy patch to be removed from the Sphinx package (see #10118).

Type

standard

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.13.0

install-requires.txt:

pygments >=2.3.1

Equivalent System Packages

conda:

$ conda install pygments

homebrew:

$ brew install pygments

macports: install the following packages: py-pygments

opensuse:
$ sudo zypper install python3-Pygments

void:

$ sudo xbps-install python3-Pygments

See https://repology.org/project/pygments/versions, https://repology.org/project/python:pygments/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.292 pygraphviz: Python interface to Graphviz

Description

Python interface to Graphviz

License

BSD

Upstream Contact

https://pypi.org/project/pygraphviz/

Type

optional

Dependencies

- $(PYTHON)
  - libgraphviz: Graph visualization software (callable library)
  - $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

pygraphviz

install-requires.txt:

pygraphviz
Equivalent System Packages

conda:

```
$ conda install pygraphviz
```

macports: install the following packages: py-pygraphviz

See https://repology.org/project/python:pygraphviz/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.293 pynormaliz: Python bindings for the normaliz library

Description

The Python module PyNormaliz provides wrappers for normaliz.

License

- GPL v2 or later

Upstream Contact

https://github.com/sebasguts/PyNormaliz

Special Update/Build Instructions

Type

optional

Dependencies

- `${PYTHON}`
- `normaliz: Computations in affine monoids, vector configurations, lattice polytopes, and rational cones`
- `${PYTHON_TOOLCHAIN}`

Version Information

package-version.txt:

```
2.18
```

install-requires.txt:

```
pynormaliz ==2.18
```
Equivalent System Packages

arch:

$ sudo pacman -S python-pynormaliz

conda:

$ conda install pynormaliz


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.294 pyparsing: A Python parsing module

Description

A Python Parsing Module

License

MIT License

Upstream Contact

- Author: Paul McGuire
- Home page: http://pyparsing.wikispaces.com

Type

standard

Dependencies

- $(PYTHON)
- pip: Tool for installing and managing Python packages
- wheel: A built-package format for Python
- flit_core: Distribution-building parts of Flit. See flit package for more information
- tomli: A lil’ TOML parser
**Version Information**

package-version.txt:

```
3.0.9
```

install-requires.txt:

```
pyparsing >=2.3.0
```

**Equivalent System Packages**

conda:

```
$ conda install pyparsing
```

opensuse:

```
$ sudo zypper install python3-pyparsing
```

void:

```
$ sudo xbps-install python3-parsing
```

See [https://repology.org/project/pyparsing/versions](https://repology.org/project/pyparsing/versions), [https://repology.org/project/python:pyparsing/versions](https://repology.org/project/python:pyparsing/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

**4.1.295 pyppeteer: Headless chrome/chromium automation library**

**Description**

Headless chrome/chromium automation library (unofficial port of puppeteer)

**License**

MIT

**Upstream Contact**

[https://pypi.org/project/pyppeteer/](https://pypi.org/project/pyppeteer/)
Type

optional

Dependencies

- $(PYTHON)
- appdirs: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
- importlib_metadata: Library to access the metadata for a Python package
- urllib3: HTTP library with thread-safe connection pooling, file post, and more.
- certifi: Python package for providing Mozilla’s CA Bundle
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

pyppeteer

Equivalent System Packages

conda:

$ conda install pyppeteer

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.296 pyproject_metadata: PEP 621 metadata parsing

Description

PEP 621 metadata parsing

License

MIT
**Upstream Contact**

https://pypi.org/project/pyproject-metadata/

**Type**

standard

**Dependencies**

- $(PYTHON)
- *packaging: Core utilities for Python packages*
- *pyparsing: A Python parsing module*
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
0.6.1
```

install-requires.txt:

```
pyproject-metadata
```

**Equivalent System Packages**

(none known)

**4.1.297 pyrsistent: Persistent data structures in Python**

**Description**

Pyrsistent is a number of persistent collections (by some referred to as functional data structures). Persistent in the sense that they are immutable.

**License**

MIT License
Upstream Contact

Home page: http://github.com/tobgu/pyrsistent/

Dependencies

- Python
- setuptools
- hypothesis
- memory-profiler
- pyperform
- pytest
- Sphinx
- sphinx-rtd-theme
- tox

Type

standard

Dependencies

- $(PYTHON)
- vcversioner: Python build system extension to obtain package version from version control
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
0.19.2
```

install-requires.txt:

```
pyrsistent >=0.16.0
```
**Equivalent System Packages**

conda:

```
$ conda install pyrsistent
```

macports: install the following packages: py-pyrsistent

void:

```
$ sudo xbps-install python3-pyrsistent
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.298 pyscipopt: Python interface and modeling environment for SCIP

**Description**

Python interface and modeling environment for SCIP

**License**

MIT

**Upstream Contact**

https://pypi.org/project/PySCIPOpt/

**Dependencies**

scipoptsuite

**Type**

optional

**Dependencies**

- `$(PYTHON)
- `scip`: Mixed integer programming solver
- `$(PYTHON_TOOLCHAIN)
- `cython`: C-Extensions for Python, an optimizing static compiler
**Version Information**

package-version.txt:

| 4.3.0 |

install-requires.txt:

| PySCIPOpt |

**Equivalent System Packages**

conda:

$ conda install pyscipopt

freebsd:

$ sudo pkg install math/py-PySCIPOpt

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.299 pysingular: A basic Python interface to Singular**

**Description**

A basic interface to call Singular from python

This python module is meant to be used in Singulars Jupyter interface.

**License**

GPL version 2 or later

**Upstream Contact**

- https://github.com/sebasguts/SingularPython

**Type**

optional
Dependencies

- $(PYTHON)
- *singular*: Computer algebra system for polynomial computations, algebraic geometry, singularity theory
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.9.7

install-requires.txt:

pysingular >=0.9.5

Equivalent System Packages

conda:

$ conda install pysingular


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.300 pytest: Simple powerful testing with Python

Description

pytest: simple powerful testing with Python

License

MIT

Upstream Contact

https://pypi.org/project/pytest/
Type

optional

Dependencies

- $(PYTHON)
- pluggy: plugin and hook calling mechanisms for python
- packaging: Core utilities for Python packages
- attrs: Decorator for Python classes with attributes
- py: library with cross-python path, ini-parsing, io, code, log facilities
- pyparsing: A Python parsing module
- importlib_metadata: Library to access the metadata for a Python package
- toml: A lil’ TOML parser
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

```bash
pytest
```

Equivalent System Packages

conda:

```bash
$ conda install pytest
```

macports: install the following packages: py-pytest

void:

```bash
$ sudo xbps-install python3-pytest
```

See https://repology.org/project/python:pytest/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.301 pytest_mock: Thin-wrapper around the mock package for easier use with pytest

Description

Thin-wrapper around the mock package for easier use with pytest

License

MIT

Upstream Contact

https://pypi.org/project/pytest-mock/

Type

optional

Dependencies

- $(PYTHON)
- pytest: Simple powerful testing with Python
- packaging: Core utilities for Python packages
- attrs: Decorator for Python classes with attributes
- pluggy: plugin and hook calling mechanisms for python
- tomli: A lil’ TOML parser
- py: library with cross-python path, ini-parsing, io, code, log facilities
- pyparsing: A Python parsing module
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

pytest-mock
Equivalent System Packages

(none known)

4.1.302 pytest_xdist: pytest xdist plugin for distributed testing and loop-on-failing modes

Description

pytest xdist plugin for distributed testing and loop-on-failing modes

License

MIT

Upstream Contact

https://pypi.org/project/pytest-xdist/

Type

optional

Dependencies

- $(PYTHON)
- pytest: Simple powerful testing with Python
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

pytest-xdist

Equivalent System Packages

conda:

$ conda install pytest-xdist

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
**4.1.303 python3: The Python programming language**

**Description**

By default, Sage will try to use system’s python3 to set up a virtual environment, a.k.a. `venv` rather than building a Python 3 installation from scratch.

Sage will accept versions 3.8.x to 3.10.x.

You can also use `--with-python=/path/to/python3_binary` to tell Sage to use `/path/to/python3_binary` to set up the venv. Note that setting up the venv requires a number of Python modules to be available within the Python in question. Currently, as of Sage 9.7, these modules are as follows: `sqlite3`, `ctypes`, `math`, `hashlib`, `crypt`, `socket`, `zlib`, `distutils.core`, `ssl` - they will be checked for by the `configure` script.

Use the `configure` option `--without-system-python3` in case you want Python 3 built from scratch.

**Upstream Contact**

https://www.python.org

**Type**

standard

**Dependencies**

- `zlib`: Data compression library
- `readline`: Command line editing library
- `sqlite`: An SQL database engine
- `libpng`: Bitmap image support
- `bzip2`: High-quality data compressor
- `liblzma`: General-purpose data compression software
- `xz`: General-purpose data compression software
- `libffi`: A portable foreign-function interface library
- `openssl`: Implementation of the SSL and TLS protocols

**Version Information**

package-version.txt:

```
3.11.1
```
**Equivalent System Packages**

alpine: install the following packages: python3-dev

cygwin:

```
$ apt-cyg install python39-devel python-pip-wheel python-setuptools-wheel
```

Debian/Ubuntu:

```
$ sudo apt-get install python3 libpython3-dev python3-distutils python3-venv
```

Fedora/Redhat/CentOS:

```
$ sudo yum install python3-devel
```

freebsd:

```
$ sudo pkg install lang/python
```

homebrew:

```
$ brew install python3
```

macports: install the following packages: python39

opensuse:

```
$ sudo zypper install python3-devel
```

void:

```
$ sudo xbps-install python3-devel
```

See [https://repology.org/project/python/versions](https://repology.org/project/python/versions)

If the system package is installed, `./configure` will check whether it can be used.

4.1.304 **python_build: A simple, correct PEP517 package builder**

**Description**

build is a simple, correct PEP517 package builder

**License**

MIT
External Packages, Release 10.0

Upstream Contact

https://pypi.org/project/build/

Type

optional

Dependencies

- $(PYTHON)
- pyparsing: A Python parsing module
- toml: A lil' TOML parser
- packaging: Core utilities for Python packages
- $(PYTHON_TOOLCHAIN)

Version Information

requirements.txt:

build

Equivalent System Packages

conda:

$ conda install build

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.305 python_igraph: Python bindings for igraph

Description

igraph is a library for creating and manipulating graphs. It is intended to be as powerful (ie. fast) as possible to enable the analysis of large graphs.
License
GPL version 2

Upstream Contact
http://igraph.org/python/

Special Update/Build Instructions

Type
optional

Dependencies
- *igraph*: A library for creating and manipulating graphs
- *texttable*: Python module for creating simple ASCII tables
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.10.2

install-requires.txt:

igraph

Equivalent System Packages

conda:

$ conda install python-igraph

macports: install the following packages: py-igraph


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.306 pythran: Ahead of Time compiler for numeric kernels

Description
Ahead of Time compiler for numeric kernels

License
BSD 3-Clause

Upstream Contact
https://pypi.org/project/pythran/

Type
standard

Dependencies
- $(PYTHON)
- beniget: Extract semantic information about static Python code
- gast: Python AST that abstracts the underlying Python version
- ply: Python Lex & Yacc
- numpy: Package for scientific computing with Python
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
0.12.1

install-requires.txt:
pythran

Equivalent System Packages
conda:
$ conda install pythran

void:
$ sudo xbps-install pythran
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.307 pytz: Timezone definitions for Python

Description

World Timezone Definitions for Python See https://pypi.org/project/pytz/

Special Update/Build Instructions

The upstream tarball was repackaged after sanitizing the file permissions with
$ chmod go-w

Type

standard

Dependencies

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.5

install-requires.txt:

pytz >=2020.1

Equivalent System Packages

conda:

$ conda install pytz

macports: install the following packages: py-tz

opensuse:

$ sudo zypper install python3-pytz

void:

$ sudo xbps-install python3-pytz

4.1. Details of external packages

411
See https://repology.org/project/python:pytz/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.308 pytz_deprecation_shim: Shims to make deprecation of pytz easier

Description

Shims to make deprecation of pytz easier

License

Apache-2.0

Upstream Contact

https://pypi.org/project/pytz-deprecation-shim/

Type

standard

Dependencies

- $(PYTHON)
- tzdata: Provider of IANA time zone data
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.1.0.post0

install-requires.txt:

pytz-deprecation-shim
**Equivalent System Packages**

conda:

```
$ conda install pytz-deprecation-shim
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/pull/29023).

### 4.1.309 pyx: Generate PostScript, PDF, and SVG files in Python

**Description**

Python package for the generation of PostScript, PDF, and SVG files

https://pypi.python.org/pypi/PyX

**Type**

optional

**Dependencies**

**Version Information**

requirements.txt:

```
pyx
```

**Equivalent System Packages**

macports: install the following packages: py-pyx

opensuse:

```
$ sudo zypper install python3-PyX
```

void:

```
$ sudo xbps-install python3-pyx
```

See [https://repology.org/project/python:pyx/versions](https://repology.org/project/python:pyx/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/sagemath/sage/pull/27330)
4.1.310  pyzmq: Python bindings for the zeromq networking library

Description
Python bindings for the zeromq networking library.

License
LGPLv3+

Upstream Contact
http://www.zeromq.org

Special Update/Build Instructions
None.

Type
standard

Dependencies
- ${PYTHON}
- cython: C-Extensions for Python, an optimizing static compiler
- zeromq: A modern networking library
- ${PYTHON_TOOLCHAIN}

Version Information

package-version.txt:

```
24.0.1
```

install-requires.txt:

```
pyzmq >=19.0.2
```
**Equivalent System Packages**

conda:

```
$ conda install pyzmq
```

opensuse:

```
$ sudo zypper install python3-pyzmq
```

void:

```
$ sudo xbps-install python3-pyzmq
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.311 qdldl_python: QDLDL, a free LDL factorization routine (Python wrapper)

**Description**

QDLDL, a free LDL factorization routine.

**License**

Apache 2.0

**Upstream Contact**

https://pypi.org/project/qdldl/

**Type**

optional

**Dependencies**

- $(PYTHON)
- pybind11: Create Python bindings to C++ code
- numpy: Package for scientific computing with Python
- scipy: Scientific tools for Python
- $(PYTHON_TOOLCHAIN)
- cmake: A cross-platform build system generator
Version Information

package-version.txt:

0.1.5.post3

install-requires.txt:

qdldl

Equivalent System Packages

conda:

$ conda install qdldl-python

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.312 qepcad: Quantifier elimination by partial cylindrical algebraic decomposition

Description

Qepcad is an implementation of quantifier elimination by partial cylindrical algebraic decomposition

License

QEPCAD B Copyright (c) 1990, 2008, Hoon Hong & Chris Brown (contact wcbrown@usna.edu)

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Upstream Contact

- Website: http://www.usna.edu/CS/qepcadweb/B/QEPCAD.html
- Alternative location (sometimes more up-to-date):
  https://www.usna.edu/Users/cs/wcbrown/qepcad/B/QEPCAD.html
**Special Update/Build Instructions**

One might need to set MAKE to “make -j1” for this to be built successfully.

**Type**

experimental

**Dependencies**

- *readline*: Command line editing library
- *saclib*: Computations with real algebraic numbers

**Version Information**

package-version.txt:

```
B.1.72
```

**Equivalent System Packages**

See [https://repology.org/project/qepcad-b/versions](https://repology.org/project/qepcad-b/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.313 qhull: Compute convex hulls, Delaunay triangulations, Voronoi diagrams

**Description**

From the README.txt of Qhull:

Qhull computes convex hulls, Delaunay triangulations, Voronoi diagrams, furthest-site Voronoi diagrams, and half-space intersections about a point. It runs in 2-d, 3-d, 4-d, or higher. It implements the Quickhull algorithm for computing convex hulls. Qhull handles round-off errors from floating point arithmetic. It can approximate a convex hull.

The program includes options for hull volume, facet area, partial hulls, input transformations, randomization, tracing, multiple output formats, and execution statistics.

Further notes:

The qhull library is already shipped with the Python library scipy (from version 1.4), see


There is also the Python interface Pyhull available on PyPI [https://pypi.python.org/pypi/pyhull](https://pypi.python.org/pypi/pyhull) (see also documentation at [http://pythonhosted.org/pyhull/](http://pythonhosted.org/pyhull/)).
External Packages, Release 10.0

Upstream Contact

http://www.qhull.org/html

C. Bradford Barber bradb@shore.net or qhull@qhull.org

Dependencies

Can be compiled with Qt support, but the Sage version currently doesn’t try to do this.

License

Not a standard license, but Sage compatible. See the COPYING.txt file in the source directory for details.

Type

standard

Dependencies

• cmake: A cross-platform build system generator

Version Information

package-version.txt:

2020-src-8.0.2

Equivalent System Packages

arch:

$ sudo pacman -S qhull

conda:

$ conda install qhull

cygwin:

$ apt-cyg install qhull

Debian/Ubuntu:

$ sudo apt-get install libqhull-dev

Fedora/Redhat/CentOS:

$ sudo yum install qhull qhull-devel

freebsd: 
$ sudo pkg install math/qhull

gentoo:
$ sudo emerge media-libs/qhull

homebrew:
$ brew install qhull

macports: install the following packages: qhull

nix:
$nix-env --install qhull

opensuse:
$ sudo zypper install qhull-devel

void:
$sudo xbps-install qhull libqhull-devel

See https://repology.org/project/qhull/versions

If the system package is installed, ./configure will check whether it can be used.

**4.1.314 r: A free software environment for statistical computing and graphics**

**Description**

R is a language and environment for statistical computing and graphics. It is a GNU project which is similar to the S language and environment which was developed at Bell Laboratories (formerly AT&T, now Lucent Technologies) by John Chambers and colleagues. R can be considered as a different implementation of S. There are some important differences, but much code written for S runs unaltered under R.

(taken from http://www.r-project.org/)

**License**

- GPL v2 or GPL v3

**Upstream Contact**

- https://www.r-project.org
- R mailing list, #R in IRC
Type
optional

Dependencies

Version Information

Equivalent System Packages

arch:

$ sudo pacman -S r

conda:

$ conda install r r-essentials

cygwin:

$ apt-cyg install R libtirpc-devel

Debian/Ubuntu:

$ sudo apt-get install r-base-dev r-cran-lattice

Fedora/Redhat/CentOS:

$ sudo yum install R R-devel

freebsd:

$ sudo pkg install math/R

gentoo:

$ sudo emerge dev-lang/R

homebrew:

$ brew install r

macports: install the following packages: R

nix:

$ nix-env --install R

opensuse:

$ sudo zypper install R-base

void:

$ sudo xbps-install R
See https://repology.org/project/r/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.315 r_jupyter: Jupyter kernel for R

Description

This package installs IRkernel, the R Jupyter kernel.
It gets installed via R’s package installer on top of Jupyter.

License

MIT

Upstream Contact

- https://github.com/IRkernel/IRkernel
- https://irkernel.github.io/

Dependencies

- R
- notebook

Type

experimental

Dependencies

- notebook: Jupyter notebook, a web-based notebook environment for interactive computing
- r: A free software environment for statistical computing and graphics

Version Information

Equivalent System Packages

See https://repology.org/project/r:irkernel/versions
However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.316 readline: Command line editing library

Description

The GNU Readline library provides a set of functions for use by applications that allow users to edit command lines as they are typed in. Both Emacs and vi editing modes are available. The Readline library includes additional functions to maintain a list of previously-entered command lines, to recall and perhaps reedit those lines, and perform csh-like history expansion on previous commands.

Website: http://tiswww.case.edu/php/chet/readline/rltop.html

License

• GPL V3+

Upstream Contact

• Chet Ramey at http://cnswww.cns.cwru.edu/~chet

Special Update/Build Instructions

We build readline using ncurses. Readline needs to be told to link with libtinfo (part of ncurses), this is what the patch 0002-ltinfo.patch does.

Patches

• 0001-macports.patch: Changes to shobj.conf for OS/X, from macports:
  https://trac.macports.org/browser/trunk/dports/devel/readline/files/patch-shobj-conf.diff
• 0002-ltinfo.patch: We build readline using ncurses, and for that it needs to be told to link with libtinfo (part of ncurses).

Type

standard

Dependencies

• ncurses: Classic terminal output library
Version Information

package-version.txt:

8.1.2

Equivalent System Packages

arch:

$ sudo pacman -S readline

conda:

$ conda install readline

cygwin:

$ apt-cyg install libreadline-devel

Debian/Ubuntu:

$ sudo apt-get install libreadline-dev

Fedora/Redhat/CentOS:

$ sudo yum install readline-devel

freebsd:

$ sudo pkg install devel/readline

homebrew:

$ brew install readline

macports: install the following packages: readline

nix:

$ nix-env --install readline

opensuse:

$ sudo zypper install readline-devel "pkgconfig(readline)"

slackware:

$ sudo slackpkg install readline

void:

$ sudo xbps-install readline-devel

See https://repology.org/project/readline/versions

If the system package is installed, ./configure will check whether it can be used.

4.1. Details of external packages
4.1.317 requests: An HTTP library for Python

Description
Python HTTP for Humans.

License
Apache 2.0

Upstream Contact
https://pypi.org/project/requests/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- idna: Internationalized Domain Names in Applications (IDNA)
- urllib3: HTTP library with thread-safe connection pooling, file post, and more.
- certifi: Python package for providing Mozilla’s CA Bundle
- charset_normalizer: The Real First Universal Charset Detector. Open, modern and actively maintained alternative to Chardet.

Version Information
package-version.txt:

2.28.1

install-requires.txt:

requests >=2.13.0
Equivalent System Packages

conda:

```bash
$ conda install requests
```

macports: install the following packages: py-requests

```bash
$ sudo zypper install python3-requests
```

opensuse:

```bash
$ sudo zypper install python3-requests
```

void:

```bash
$ sudo xbps-install python3-requests
```

See https://repology.org/project/requests/versions, https://repology.org/project/python:requests/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.318 retrolab: JupyterLab Distribution with a retro look and feel

Description

JupyterLab Distribution with a retro look and feel

License

Upstream Contact

https://pypi.org/project/retrolab/

Type

optional

Dependencies

- $(PYTHON)
- jupyterlab: An extensible environment for interactive and reproducible computing
- $(PYTHON_TOOLCHAIN)
Version Information

requirements.txt:

| retrolab ~= 0.3 |

Equivalent System Packages

conda:

```
$ conda install retrolab
```

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.319 rpy2: Python interface to R

Description

rpy2 is a redesign and rewrite of rpy. It is providing a low-level interface to R, a proposed high-level interface, including wrappers to graphical libraries, as well as R-like structures and functions.

License

- GPL 2+
- Note that we have deleted references to Mozilla PL as an option, which we are allowed to do by the full rpy2 license in order to remain GPL-compatible

Upstream Contact

- https://rpy2.bitbucket.io

Special Update/Build Instructions

Patches

- setup.patch: takes care of a few parsing issues.
- cygwin.patch: let rpy2 build on Cygwin.
Type

standard

Dependencies

- $(PYTHON)
- r: A free software environment for statistical computing and graphics
- cffi: Foreign Function Interface for Python calling C code
- tzlocal: Python timezone information for the local timezone
- pytz: Timezone definitions for Python
- jinja2: General purpose template engine for Python
- $(PYTHON_TOOLCHAIN)
- pycparser: Parser of the C language in Python

Version Information

package-version.txt:

3.4.5

install-requires.txt:

rpy2 >=3.3

Equivalent System Packages

conda:

$ conda install rpy2

See https://repology.org/project/rpy2/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.320 rst2ipynb: Convert reStructuredText files to Jupyter notebooks

Description

The rst2ipynb program converts a standalone reStructuredText file to a Jupyter notebook file.
This is currently achieved by converting to markdown with pandoc and then to Jupyter notebook using notedown, plus some configuration and tweaks.
License

BSD 3-Clause License

Upstream Contact

Authors: Scott Sievert and Nicolas M. Thiéry Home page: https://github.com/nthiery/rst-to-ipynb

Special Update/Build Instructions

Fetch tarball from https://pypi.python.org/pypi/rst2ipynb/
As it is written in Haskell, pandoc must be installed from the distro.
The main rationale for having a notedown package in Sage (rather than just let pip fetch it) is that the version on pipy (1.5.0, 2015-10-07) is outdated and lacks important features / fixes for us.

Type

optional

Dependencies

- $(PYTHON)
  - pandoc: A document converter
- $(PYTHON_TOOLCHAIN)
  - notedown: Create IPython notebooks from markdown

Version Information

package-version.txt:

0.2.3

install-requires.txt:

rst2ipynb >=0.2.2

Equivalent System Packages

See https://repology.org/project/python rst2ipynb/versions
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.321 rubiks: Programs for Rubik’s cube

Description

There are several programs for working with Rubik’s cubes, by three different people. Look inside the directories under /src to see specific info and licensing. In summary the three contributors are:

Michael Reid (GPL) http://www.cflmath.com/~reid/Rubik/optimal_solver.html
  • optimal - uses many pre-computed tables to find an optimal solution to the 3x3x3 Rubik’s cube

Dik T. Winter (MIT License)
  • cube - uses Kociemba’s algorithm to iteratively find a short solution to the 3x3x3 Rubik’s cube
  • size222 - solves a 2x2x2 Rubik’s cube

  • cu2 - A fast, non-optimal 2x2x2 solver
  • cubex - A fast, non-optimal 3x3x3 solver
  • mcube - A fast, non-optimal 4x4x4 solver

Type

optional

Dependencies

Version Information

package-version.txt:

```
20070912.p21
```

Equivalent System Packages

arch:

```
$ sudo pacman -S rubiks
```

conda:

```
$ conda install rubiks
```

Debian/Ubuntu:

```
$ sudo apt-get install rubiks
```

Fedora/Redhat/CentOS:

```
$ sudo yum install rubiks
```

freebsd:
$ sudo pkg install math/rubiks

nix:

$ nix-env --install rubiks

See https://repology.org/project/rubiks/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

### 4.1.322 rw: Compute rank-width and rank-decompositions

**Description**

rw is a program that calculates rank-width and rank-decompositions.

https://sourceforge.net/projects/rankwidth/

**License**

GPL version 2 or later

**Upstream Contact**

Philipp Klaus Krause (philipp@informatik.uni-frankfurt.de)

**Type**

standard

**Dependencies**

**Version Information**

package-version.txt:

0.9

**Equivalent System Packages**

arch:

$ sudo pacman -S rankwidth

conda:

$ conda install rw

Debian/Ubuntu:
$ sudo apt-get install librw-dev

Fedora/Redhat/CentOS:

$ sudo yum install rw-devel

freebsd:

$ sudo pkg install math/rankwidth

nix:

$ nix-env --install rankwidth

void:

$ sudo xbps-install rankwidth-devel

See https://repology.org/project/rankwidth/versions

If the system package is installed, `./configure` will check whether it can be used.

### 4.1.323 saclib: Computations with real algebraic numbers

**Description**

Saclib is a library of C programs for computer algebra derived from the SAC2 system. It is mainly used as a dependency of qepcad.

**License**

Saclib 2.2 Copyright (c) 1993, 2008, RISC-Linz (contact wcbrown@usna.edu)

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Upstream Contact

- Website: http://www.usna.edu/CS/qepcadweb/B/QEPCAD.html
- Alternative location (sometimes more up-to-date):
  https://www.usna.edu/Users/cs/wcbrown/qepcad/B/QEPCAD.html

Type

optional

Dependencies

Version Information

package-version.txt:

2.2.7

Equivalent System Packages

See https://repology.org/project/saclib/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.324 sage_conf: Configuration module for the SageMath library (distributable version)

Description

This distribution package provides:

- a single Python module, sage_conf, providing configuration information to the SageMath library at the time of its installation and at its runtime
- a console script sage-config, for querying the variables of sage_conf from the shell
- a sourcable shell script sage-env-config, providing additional configuration information in the form of environment variables

The sage_conf distribution package is polymorphic: It has several implementations.
sage_conf sdist on PyPI

This implementation of the sage_conf distribution package comes from github issue #29039, which added the directory pkgs/sage-conf_pypi.

To install, use `pip install -v sage_conf`. Using `-v` ensures that diagnostic messages are displayed.

On installation (or building a wheel), it invokes `sage_bootstrap` to establish a build tree (SAGE_ROOT) and installation tree (SAGE_LOCAL) for the SageMath distribution. By default, it uses a subdirectory of $HOME/.sage that is specific to the version of the distribution and the version of Python in use. If several virtual environments over the same version of Python install `sage_conf`, they will share these trees.

After installation of `sage_conf`, a wheelhouse containing wheels of various libraries is available; type `ls $(sage-config SAGE_SPKG_WHEELS)` to list them and `pip install $(sage-config SAGE_SPKG_WHEELS)/*.whl` to install them. After this, you can install the Sage library, for example, using `pip install sagemath-standard`.

sage_conf wheels

Prebuilt binary wheels of the sage_conf distribution package are available at https://github.com/sagemath/sage-wheels/releases/

This implementation of `sage_conf` comes from github issue #31396, which adds the directory pkgs/sage-conf_relocatable/.

On building a wheel, it invokes `sage_bootstrap` to establish a build and installation tree (SAGE_ROOT, SAGE_LOCAL) in a subdirectory of the directory /var/tmp/, whose name is specific to the version of the distribution and the version of Python in use.

The wheel distributes a copy of the prebuilt SAGE_ROOT and SAGE_LOCAL. Importing `sage_conf` (or using the installed `sage-config` script), makes sure that a symlink from the /var/tmp location to the actual persistent installation location is created. As the relocated libraries and programs contain the hardcoded path SAGE_LOCAL in various ways (including as rpaths), this symlink is necessary for the prebuilt libraries and programs to work.

/var/tmp is a sticky directory on all Linux distributions following the Filesystem Hierarchy Standard, as well as on macOS and on Cygwin. On multi-user systems, only one user can use a given version of the distribution; other installation schemes are recommended for systems with multiple Sage users.

sage_conf in the SageMath distribution

The original version of the distribution package `sage_conf` is used internally in the SageMath distribution. It is provided in the directory pkgs/sage-conf. This version of the package is generated by the Sage distribution's configure script.

sage_conf in downstream distributions

Downstream packagers and advanced developers and users may want to provide their own implementation of the distribution package to support the intended deployment of the SageMath library.
License

GNU General Public License (GPL) v3 or later

Upstream Contact

https://www.sagemath.org

This package is included in the source code of the Sage distribution, in pkgs/sage-conf*.

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```
# This file is updated on every release by the sage-update-version script
sage-conf ~= 10.0
```

Equivalent System Packages

(none known)

4.1.325 Sage: Open Source Mathematics Software: Build system of the Sage documentation

About SageMath

“Creating a Viable Open Source Alternative to
Magma, Maple, Mathematica, and MATLAB”

Copyright (C) 2005-2020 The Sage Development Team

https://www.sagemath.org

SageMath fully supports all major Linux distributions, recent versions of macOS, and Windows (using Cygwin or Windows Subsystem for Linux).

The traditional and recommended way to install SageMath is from source via Sage-the-distribution (https://www.sagemath.org/download-source.html). Sage-the-distribution first builds a large number of open source packages from
source (unless it finds suitable versions installed in the system) and then installs the Sage Library (sagelib, implemented in Python and Cython).

About this pip-installable source distribution

This is the build system of the Sage documentation, based on Sphinx.

Type

standard

Dependencies

- $(PYTHON)
- $sphinx: Python documentation generator$
- $(PYTHON_TOOLCHAIN)
- sagelib

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```
# This file is updated on every release by the sage-update-version script
sage-docbuild ~= 10.0
```

Equivalent System Packages


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.326 sage_flatsurf: computation with flat surfaces

Description

SageMath package for studying the geometry of flat surfaces and the dynamics of their foliations.
License

GNU General Public License, version 2

Upstream Contact

https://pypi.org/project/sage-flatsurf/

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- surface_dynamics: dynamics on surfaces (measured foliations, interval exchange transformation, Teichmüller flow, etc)
- $(SAGERUNTIME)

Version Information

requirements.txt:

```
sage-flatsurf
```

Equivalent System Packages

(none known)

4.1.327 sage_numerical_backends_coin: COIN-OR backend for Sage MixedIntegerLinearProgram

Description

COIN-OR backend for Sage MixedIntegerLinearProgram

License

GPLv2+
Upstream Contact

https://pypi.org/project/sage-numerical-backends-coin/

Type

optional

Dependencies

- cbc: COIN-OR branch and cut solver for mixed-integer programs
- cysignals: Interrupt and signal handling for Cython
- $(SAGERUNTIME)
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

Version Information

package-version.txt:

9.0b12

install-requires.txt:

sage_numerical_backends_coin >=9.0b12

Equivalent System Packages


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.328 sage_numerical_backends_cplex: Cplex backend for Sage MixedIntegerLinearProgram

Description

Cplex backend for Sage MixedIntegerLinearProgram
License

GPLv2+

Upstream Contact

https://pypi.org/project/sage-numerical-backends-cplex/

Type

optional

Dependencies

- cysignals: Interrupt and signal handling for Cython
- $(SAGERUNTIME)
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

Version Information

package-version.txt:

9.0b12

install-requires.txt:

sage_numerical_backends_cplex >=9.0b12

Equivalent System Packages

See https://repology.org/project/python:sage-numerical-backends-cplex/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.329 sage_numerical_backends_gurobi: Gurobi backend for Sage MixedIntegerLinearProgram

Description

Gurobi backend for Sage MixedIntegerLinearProgram
License

GPLv2+

Upstream Contact

https://pypi.org/project/sage-numerical-backends-gurobi/

Type

optional

Dependencies

- cysignals: Interrupt and signal handling for Cython
- $(SAGERUNTIME)
- $(PYTHON_TOOLCHAIN)
- cython: C-Extensions for Python, an optimizing static compiler
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

Version Information

package-version.txt:

9.3.1

install-requires.txt:

sage_numerical_backends_gurobi >=9.0.0

Equivalent System Packages


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.330 sage-setup: Build system of the SageMath library

This is the build system of the Sage library, based on setuptools.
Type

standard

Dependencies

- $(PYTHON)
- cython: C-Extensions for Python, an optimizing static compiler
- pkgconfig: Python interface to pkg-config
- jinja2: General purpose template engine for Python
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

10.0

install-requires.txt:

# This file is updated on every release by the sage-update-version script
sage-setup ~= 10.0

Equivalent System Packages

(none known)

4.1.331 sage_sws2rst: Translate legacy Sage worksheet files (.sws) to reStructuredText (.rst) files

Description

Provides a script sage — sws2rst, which translates a Sage worksheet file (.sws) into a reStructuredText (.rst) file.

Sage worksheet files (.sws) are a file format that was used by the now-obsolete Sage notebook (https://github.com/sagemath/sagenb), superseded by the Jupyter notebook. SageNB was dropped in the course of the transition of Sage-Math to Python 3.

This package was extracted from the SageNB sources in github issue #28838 to provide a way to convert pedagogical material written available in Sage worksheet format.
Type

optional

Dependencies

- $(PYTHON)
- beautifulsoup4: Screen-scraping library
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```bash
# This file is updated on every release by the sage-update-version script
sage-sws2rst ~= 10.0
```

Equivalent System Packages

(none known)

4.1.332 Sage: Open Source Mathematics Software: Sage categories and basic rings

About SageMath

“Creating a Viable Open Source Alternative to
Magma, Maple, Mathematica, and MATLAB”

Copyright (C) 2005-2022 The Sage Development Team

https://www.sagemath.org

SageMath fully supports all major Linux distributions, recent versions of macOS, and Windows (using Cygwin or Windows Subsystem for Linux).

The traditional and recommended way to install SageMath is from source via Sage-the-distribution (https://www.sagemath.org/download-source.html). Sage-the-distribution first builds a large number of open source packages from source (unless it finds suitable versions installed in the system) and then installs the Sage Library (sagelib, implemented in Python and Cython).
About this experimental pip-installable source distribution

This pip-installable source distribution `sagemath-categories` is an experimental distribution of a small part of the Sage Library. Use at your own risk. It provides a small subset of the modules of the Sage library ("sagelib", `sagemath-standard`). It is a superset of the `sagemath-objects` (providing Sage objects, the element/parent framework, categories, the coercion system and the related metaclasses), making various additional categories available without introducing dependencies on additional mathematical libraries.

Dependencies

When building from source, development packages of `gmp`, `mpfr`, and `mpc` are needed.

Documentation

- Categories
- Structure
- Coercion
- Classes, Metaclasses

Type

experimental

Dependencies

- $(PYTHON)
- Sage: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses
- $(PYTHON_TOOLCHAIN)
- Sage: Open Source Mathematics Software: System and software environment
- sage-setup: Build system of the SageMath library
- cython: C-Extensions for Python, an optimizing static compiler
- pkgconfig: Python interface to pkg-config
- python_build: A simple, correct PEP517 package builder

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```
# This file is updated on every release by the sage-update-version script
sagemath-categories ~= 10.0
```
Equivalent System Packages

(none known)

4.1.333 sagemath_doc_html: SageMath documentation in HTML format

Upon installation, this package builds the SageMath documentation in HTML format.

It is a standard package. It is built on every invocation of make or make all, but not on make build. The documentation build can also be run separately using make doc-html.

Type

standard

Dependencies

- sagelib

  * sphinx: Python documentation generator
  * sphinx_copybutton: Add a copy button to each of your code cells.
  * pplpy_doc: Python interface to the Parma Polyhedra Library (documentation)
  * $(SAGERUNTIME)
  * maxima: System for manipulating symbolic and numerical expressions
  * networkx: Python package for complex networks
  * scipy: Scientific tools for Python
  * sympy: Python library for symbolic mathematics
  * matplotlib: Python 2D plotting library
  * pillow: Python Imaging Library
  * mathjax: A JavaScript library for displaying mathematical formulas
  * mpmath: Pure Python library for multiprecision floating-point arithmetic
  * ipykernel: IPython Kernel for Jupyter
  * jupyter_client: Jupyter protocol implementation and client libraries
  * conway_polynomials: Tables of Conway polynomials over finite fields
  * tachyon: A ray tracing system
  * jmol: Java viewer for chemical structures in 3D
  * ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
  * jupyter_sphinx: Jupyter Sphinx Extension
  * Sage: Open Source Mathematics Software: Build system of the Sage documentation
  * elliptic_curves: Databases of elliptic curves
  * furo: A clean customizable Sphinx documentation theme
  * fpylll: Python interface for FPLLL
Version Information

Equivalent System Packages

(none known)

4.1.334 sagemath_doc_pdf: SageMath documentation in PDF format

Upon installation, this package builds the SageMath documentation in PDF format. It is an optional package. It can be enabled at configuration time using ./configure --enable-sagemath_doc_pdf. Alternatively, it can be installed by using make doc-pdf.

Type

optional

Dependencies

- `sagemath_doc_html`: SageMath documentation in HTML format
- `texlive`: A comprehensive TeX system

Version Information

Equivalent System Packages

(none known)

4.1.335 Sage: Open Source Mathematics Software: System and software environment

About SageMath

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https://www.sagemath.org

SageMath fully supports all major Linux distributions, recent versions of macOS, and Windows (using Cygwin or Windows Subsystem for Linux).

The traditional and recommended way to install SageMath is from source via Sage-the-distribution (https://www.sagemath.org/download-source.html). Sage-the-distribution first builds a large number of open source packages from source (unless it finds suitable versions installed in the system) and then installs the Sage Library (sagelib, implemented in Python and Cython).
About this experimental pip-installable source distribution

This pip-installable source distribution `sagemath -- environment` is an experimental distribution of a small part of the Sage Library. Use at your own risk. It provides a small, fundamental subset of the modules of the Sage library ("sagelib", `sagemath -- standard`), providing the connection to the system and software environment. It also includes the `sage` script for launching the Sage REPL and accessing various developer tools (see `sage --help`).

Type

experimental

Dependencies

- `$PYTHON`
- `$PYTHON_TOOLCHAIN`
- `python_build: A simple, correct PEP517 package builder`

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```
# This file is updated on every release by the sage-update-version script
sagemath-environment ~= 10.0
```

Equivalent System Packages

(none known)

4.1.336 Sage: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses

About SageMath

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Copyright (C) 2005-2022 The Sage Development Team

https://www.sagemath.org

SageMath fully supports all major Linux distributions, recent versions of macOS, and Windows (using Cygwin or Windows Subsystem for Linux).

The traditional and recommended way to install SageMath is from source via Sage-the-distribution (https://www.sagemath.org/download-source.html). Sage-the-distribution first builds a large number of open source packages from source (unless it finds suitable versions installed in the system) and then installs the Sage Library (sagelib, implemented in Python and Cython).
About this experimental pip-installable source distribution

This pip-installable source distribution *sagemath -- objects* is an experimental distribution of a small part of the Sage Library. Use at your own risk. It provides a small, fundamental subset of the modules of the Sage library ("sagelib", *sagemath -- standard*), making Sage objects, the element/parent framework, categories, the coercion system and the related metaclasses available.

Dependencies

When building from source, development packages of *gmp*, *mpfr*, and *mpc* are needed.

Documentation

- Categories
- Structure
- Coercion
- Classes, Metaclasses

Type

experimental

Dependencies

- $(PYTHON)
- cysignals: *Interrupt and signal handling for Cython*
- gmpy2: *Python interface to GMP/MPIR, MPFR, and MPC*
- $(PYTHON_TOOLCHAIN)
- *Sage: Open Source Mathematics Software: System and software environment*
- sage-setup: *Build system of the SageMath library*
- cython: *C-Extensions for Python, an optimizing static compiler*
- pkgconfig: *Python interface to pkg-config*
- python_build: *A simple, correct PEP517 package builder*

Version Information

package-version.txt:

```
10.0
```

install-requires.txt:

```
# This file is updated on every release by the sage-update-version script
sagemath-objects ~= 10.0
```
Equivalent System Packages

(none known)

4.1.337  Sage: Open Source Mathematics Software: IPython kernel, Sage preparser, doctester

About SageMath

“Creating a Viable Open Source Alternative to
Magma, Maple, Mathematica, and MATLAB”

Copyright (C) 2005-2022 The Sage Development Team

https://www.sagemath.org

SageMath fully supports all major Linux distributions, recent versions of macOS, and Windows (using Cygwin or Windows Subsystem for Linux).

The traditional and recommended way to install SageMath is from source via Sage-the-distribution (https://www.sagemath.org/download-source.html). Sage-the-distribution first builds a large number of open source packages from source (unless it finds suitable versions installed in the system) and then installs the Sage Library (sagelib, implemented in Python and Cython).

About this experimental pip-installable source distribution

This pip-installable source distribution sagemath — repl is an experimental distribution of a small part of the Sage Library. Use at your own risk. It provides a small, fundamental subset of the modules of the Sage library (“sagelib”, sagemath — standard), providing the IPython kernel, Sage preparser, and doctester.

Type

experimental

Dependencies

- $\$(PYTHON)$
- Sage: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses
- Sage: Open Source Mathematics Software: System and software environment
- ipython: Interactive computing environment with an enhanced interactive Python shell
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel
- $\$(PYTHON\_TOOLCHAIN)$
- python\_build: A simple, correct PEP517 package builder
Version Information

package-version.txt:

10.0

install-requires.txt:

# This file is updated on every release by the sage-update-version script
sagemath-repl ~= 10.0

Equivalent System Packages

(none known)

4.1.338 sagenb_export: Convert legacy SageNB notebooks to Jupyter notebooks and other formats

Description

This is a tool to convert SageNB notebooks to other formats, in particular IPython/Jupyter notebooks. It includes a Jupyter notebook extension to provide a UI for the import of SageNB notebooks.

Upstream Contact

https://github.com/vbraun/ExportSageNB

Type

standard

Dependencies

- $(PYTHON)
- notebook: Jupyter notebook, a web-based notebook environment for interactive computing
- nbconvert: Converting Jupyter Notebooks
- ipython: Interactive computing environment with an enhanced interactive Python shell
- six: Python 2 and 3 compatibility utilities
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

3.3

install-requires.txt:

sagenb_export >=3.3

Equivalent System Packages

See https://repology.org/project/sagenb-export/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.339 sagetex: Embed code, results of computations, and plots from Sage into LaTeX documents

Description

The SageTeX package allows you to embed code, results of computations, and plots from Sage into LaTeX documents.

License

The source code of the SageTeX package may be redistributed and/or modified under the terms of the GNU General Public License as published by the Free Software Foundation, either version 2 of the License, or (at your option) any later version. To view a copy of this license, see http://www.gnu.org/licenses/ or send a letter to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.

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SPKG Maintainers

Dan Drake (dr.dan.drake at gmail) and SageMath developers (sage-devel@googlegroups.com)

Upstream Contact

Author: Dan Drake.

Web: https://github.com/sagemath/sagetex
Dependencies

To install, nothing more than a standard Sage install. The `spkg-check` script will exit without actually testing anything if it cannot find “latex” in your path.

Notes


The directory `$SAGE_ROOT/venv/share/doc/sagetex` contains documentation and an example file. See `$SAGE_ROOT/venv/share/texmf/tex/latex/sagetex` for the source code and some possibly useful scripts. If you have problems or suggestions see the sage-support group.

If you want to help develop SageTeX, please clone the github repository (see the “Upstream Contact” above) and send me patches based on that.

Type

standard

Dependencies

- `$($PYTHON)`
- `maxima`: System for manipulating symbolic and numerical expressions
- `scipy`: Scientific tools for Python
- `matplotlib`: Python 2D plotting library
- `pillow`: Python Imaging Library
- `tachyon`: A ray tracing system
- `pyparsing`: A Python parsing module

Version Information

package-version.txt:

```
3.6.1
```

install-requires.txt:

```
sagetex >=3.5
```
Equivalent System Packages

conda:

```
$ conda install sagetex
```

See https://repology.org/project/sagetex/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.340 scip: Mixed integer programming solver

**Description**

SCIP is currently one of the fastest open source mixed integer programming (MIP) solvers. It is also a framework for constraint integer programming and branch-cut-and-price. It allows total control of the solution process and the access of detailed information down to the guts of the solver.

**License**

Apache 2.0

**Upstream Contact**

https://scipopt.org/#scipoptsuite

**Dependencies**

scip brings its own patched version of the bliss library. This will conflict with the optional package bliss.

**Type**

optional

**Dependencies**

- `$\text{MP\_LIBRARY}$`
- `readline`: Command line editing library
- `soplex`: Linear optimization solver using the revised simplex method
- `papilo`: Parallel presolve for integer and linear optimization
- `zlib`: Data compression library
- `cmake`: A cross-platform build system generator

4.1. Details of external packages
Version Information

package-version.txt:

802

Equivalent System Packages

conda:

$ conda install scip

See https://repology.org/project/scipoptsuite/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.341 scip_sdp: Mixed integer semidefinite programming plugin for SCIP

Description

SCIP-SDP allows to solve MISDPs using a nonlinear branch-and-bound approach or a linear programming cutting-plane approach.

- In the first case (the default), the semidefinite programming (SDP) relaxations are solve using interior-point SDP-solvers.
- In the second case, cutting planes based on eigenvector are generated.

SCIP-SDP is based on the branch-and-cut framework SCIP. In addition to providing a constraint handler for SDP-constraints and a relaxator to solve continuous SDP-relaxations using interior-point solvers, SCIP-SDP adds several heuristics and propagators to SCIP.

License

Apache 2.0

Upstream Contact

http://www.opt.tu-darmstadt.de/scipsdp/
https://github.com/scipopt/SCIP-SDP
**Type**

optional

**Dependencies**

- *scip:* Mixed integer programming solver
- *dsdp:* Semidefinite programming solver
- *cmake:* A cross-platform build system generator

**Version Information**

package-version.txt:

```
4.1.0
```

**Equivalent System Packages**

(none known)

**4.1.342 scipy: Scientific tools for Python**

**Description**

SciPy (pronounced “Sigh Pie”) is open-source software for mathematics, science, and engineering. The SciPy library depends on NumPy, which provides convenient and fast N-dimensional array manipulation. The SciPy library is built to work with NumPy arrays, and provides many user-friendly and efficient numerical routines such as routines for numerical integration and optimization. Together, they run on all popular operating systems, are quick to install, and are free of charge. NumPy and SciPy are easy to use, but powerful enough to be depended upon by some of the world’s leading scientists and engineers.

**License**

SciPy’s license is free for both commercial and non-commercial use, under the BSD terms. See [http://www.scipy.org/License_Compatibility](http://www.scipy.org/License_Compatibility)

**Upstream Contact**

[https://www.scipy.org/](https://www.scipy.org/)
Dependencies

- Python, which in Sage has numerous dependencies
- Numpy
- Fortran
- GNU patch

Special Update/Build Instructions

- None.

Type

standard

Dependencies

- $(PYTHON)
- $(BLAS)
  - gfortran: Fortran compiler from the GNU Compiler Collection
  - numpy: Package for scientific computing with Python
  - pybind11: Create Python bindings to C++ code
  - cython: C-Extensions for Python, an optimizing static compiler
  - pythran: Ahead of Time compiler for numeric kernels
  - $(PYTHON_TOOLCHAIN)
  - meson_python: Meson Python build backend (PEP 517)

Version Information

package-version.txt:

1.10.1

install-require.txt:

```# 1.8 is known good version.
# Per https://docs.scipy.org/doc/scipy/dev/core-dev/index.html#version-numbering
# and https://docs.scipy.org/doc/scipy/dev/core-dev/index.html#deprecations,
# deprecations cannot be introduced in micro releases.
# SciPy devs wait "at least 6 months", "in practice two (minor) releases"
# from deprecation to removal of a feature.
scipy >=1.5, <1.11```
### Equivalent System Packages

conda:

```
$ conda install scipy<1.11,>=1.5
```

homebrew:

```
$ brew install scipy
```

macports: install the following packages: py-scipy

opensuse:

```
$ sudo zypper install python3-scipy
```

void:

```
$ sudo xbps-install python3-scipy
```

See [https://repology.org/project/python:scipy/versions](https://repology.org/project/python:scipy/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.343 scs: Splitting conic solver

**Description**

scs: splitting conic solver

**License**

MIT

**Upstream Contact**

[https://pypi.org/project/scs/](https://pypi.org/project/scs/)

**Type**

optional
Dependencies

- $\$(PYTHON)$
- $\texttt{numpy: Package for scientific computing with Python}$
- $\$(PYTHON\_TOOLCHAIN)$
- $\texttt{cmake: A cross-platform build system generator}$

Version Information

package-version.txt:

```
3.2.2
```

install-requires.txt:

```
scs
```

Equivalent System Packages

conda:

```
$ conda install scs
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.344 send2trash: Send file to trash natively under Mac OS X, Windows and Linux

Description

Send file to trash natively under Mac OS X, Windows and Linux.

License

BSD License

Upstream Contact

https://pypi.org/project/Send2Trash/
Type

standard

Dependencies

• $({PYTHON})
• $({PYTHON_TOOLCHAIN})

Version Information

package-version.txt:
1.8.0

install-requires.txt:
send2trash >=1.5.0

Equivalent System Packages

conda:
$ conda install send2trash

macports: install the following packages: py-send2trash

opensuse:
$ sudo zypper install python3-Send2Trash

void:
$ sudo xbps-install python3-send2trash


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.345 setuptools: Build system for Python packages

Description

setuptools is the classical build system for Python packages, a collection of enhancements to the Python distutils.

This package represents version 63.x of setuptools. Sage installs this version to provide the build system for non-PEP 517 packages. In particular, Sage uses it for building numpy, whose build system numpy.distutils is not compatible with newer versions of setuptools, see https://github.com/numpy/numpy/pull/22154

4.1. Details of external packages
License

MIT License

Upstream Contact

http://pypi.python.org/pypi/setuptools/
https://github.com/pypa/setuptools

Type

standard

Dependencies

• $(PYTHON)

Version Information

package-version.txt:

63.4.3

install-requires.txt:

setuptools >=49.6.0

Equivalent System Packages

conda:

$ conda install "setuptools<64"

macports: install the following packages: py-setuptools

opensuse:

$ sudo zypper install python3-setuptools

void:

$ sudo xbps-install python3-setuptools

See https://repology.org/project/python:setuptools/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.346 setuptools_scm: Python build system extension to obtain package version from version control

Description

the blessed package to manage your versions by scm tags

License

MIT

Upstream Contact

https://pypi.org/project/setuptools-scm/

Type

standard

Dependencies

- $(PYTHON)
- typing_extensions: Backported and Experimental Type Hints for Python 3.5+
- setuptools: Build system for Python packages
- pip: Tool for installing and managing Python packages
- wheel: A built-package format for Python
- tomli: A lil’ TOML parser
- packaging: Core utilities for Python packages

Version Information

package-version.txt:

7.0.5

install-requires.txt:

setuptools_scm >=4.1.2
**Equivalent System Packages**

conda:

```
$ conda install setuptools_scm
```

macports: install the following packages: py-setuptools_scm

```
$ sudo zypper install python3-setuptools_scm
```

void:

```
$ sudo xbps-install python3-setuptools_scm
```

See [https://repology.org/project/python:setuptools-scm/versions](https://repology.org/project/python:setuptools-scm/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.347 setuptools_scm_git_archive: setuptools_scm plugin for git archives

**Description**

setuptools_scm plugin for git archives

**License**

MIT

**Upstream Contact**

[https://pypi.org/project/setuptools-scm-git-archive/](https://pypi.org/project/setuptools-scm-git-archive/)

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

1.4

install-requires.txt:

setuptools-scm-git-archive

Equivalent System Packages

(none known)

4.1.348 setuptools_wheel: Build the setuptools package as a wheel

After installing setuptools and wheel, we build a wheel of setuptools to complete the set of wheels stored in our wheelhouse.

This version of setuptools is suitable for PEP 517/518/660 builds, but it is not suitable for building numpy.

Type

standard

Dependencies

- $(PYTHON)
- setuptools: Build system for Python packages
- wheel: A built-package format for Python

Version Information

package-version.txt:

65.6.3

install-requires.txt:

# We use this file to mark the package as a Python package
Equivalent System Packages

See https://repology.org/project/python:setup tools/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.349 simplegeneric: Simple single-dispatch generic functions for Python

Description

Simple generic functions (similar to Python’s own len(), pickle.dump(), etc.)

The simple generic module lets you define simple single-dispatch generic functions, akin to Python’s built-in generic functions like len() iter() and so on. However, instead of using specially-named methods, these generic functions use simple lookup tables, akin to those used by e.g. pickle.dump() and other generic functions found in the Python standard library.

As you can see from the above examples, generic functions are actually quite common in Python already, but there is no standard way to create simple ones. This library attempts to fill that gap, as generic functions are an excellent alternative to the Visitor pattern, as well as being a great substitute for most common uses of adaptation.

This library tries to be the simplest possible implementation of generic functions, and it therefore eschews the use of multiple or predicate dispatch, as well as avoiding speedup techniques such as C dispatching or code generation. But it has absolutely no dependencies, other than Python 2.4, and the implementation is just a single Python module of less than 100 lines.

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.8.1.p0

install-requires.txt:

simplegeneric >=0.8.1
**Equivalent System Packages**

conda:

```bash
$ conda install simplegeneric
```

macports: install the following packages: py-simplegeneric

opensuse:

```bash
$ sudo zypper install python3-simplegeneric
```

void:

```bash
$ sudo xbps-install python3-simplegeneric
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.350 singular: Computer algebra system for polynomial computations, algebraic geometry, singularity theory

**Description**

Singular is a computer algebra system for polynomial computations, with special emphasis on commutative and non-commutative algebra, algebraic geometry, and singularity theory.

**License**

GPLv2 or GPLv3

**Upstream Contact**

libsingular-devel@mathematik.uni-kl.de

https://www.singular.uni-kl.de/

**Special Update/Build Instructions**

Other notes:

- If the environment variable SAGE_DEBUG is set to “yes”, then omalloc will be replaced by xalloc. The resulting Singular executable and libsingular library will be slower than with omalloc, but allow for easier debugging of memory corruptions.
**External Packages, Release 10.0**

**Type**

standard

**Dependencies**

- $(MP_LIBRARY)
- ntl: A library for doing number theory
- flint: Fast Library for Number Theory
- readline: Command line editing library
- mpfr: Multiple-precision floating-point computations with correct rounding
- cddlib: Double description method for polyhedral representation conversion

**Version Information**

package-version.txt:

4.3.1p3

**Equivalent System Packages**

**arch:**

$ sudo pacman -S singular

**conda:**

$ conda install singular

**cygwin:**

$ apt-cyg install singular-devel singular

**Debian/Ubuntu:**

$ sudo apt-get install singular singular-doc libsingular4-dev

**Fedora/Redhat/CentOS:**

$ sudo yum install Singular Singular-devel

**freebsd:**

$ sudo pkg install math/singular

**gentoo:**

$ sudo emerge sci-mathematics/singular[readline]

**homebrew:**
$ brew install singular

macports: install the following packages: singular

nix:

$ nix-env --install singular

void:

$ sudo xbps-install singular

See https://repology.org/project/singular/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.351 singular_jupyter: Jupyter kernel for Singular

**Description**

This is a beta version of a jupyter kernel for Singular.

**License**

GPL version 2 or later

**Upstream Contact**

- https://github.com/sebasguts/jupyter_kernel_singular

**Type**

optional

**Dependencies**

- ${PYTHON}
- jupyter_client: Jupyter protocol implementation and client libraries
- ${PYTHON_TOOLCHAIN}
- pysingular: A basic Python interface to Singular
- ipython: Interactive computing environment with an enhanced interactive Python shell
- ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

4.1. Details of external packages
Version Information

package-version.txt:

0.9.7

install-requires.txt:

singular_jupyter >=0.9.7

Equivalent System Packages

conda:

$ conda install jupyter-kernel-singular


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.352 sirocco: Compute topologically certified root continuation of bivariate polynomials

Description

sirocco is a library to compute topologically certified root continuation of bivariate polynomials.

License

GPLv3+

SPKG Maintainers

- Miguel Marco

Upstream Contact

Miguel Marco (mmarco@unizar.es)
**Dependencies**

- gcc

**Type**

optional

**Dependencies**

**Version Information**

package-version.txt:

2.1.0

**Equivalent System Packages**

arch:

$ sudo pacman -S sirocco

conda:

$ conda install sirocco

Fedora/Redhat/CentOS:

$ sudo yum install sirocco

opensuse:

$ sudo zypper install sirocco-devel

See [https://repology.org/project/sirocco/versions](https://repology.org/project/sirocco/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/sagemath/sage/issues/27330)

**4.1.353 six: Python 2 and 3 compatibility utilities**

**Description**

Python 2 and 3 compatibility utilities
License

MIT License

Upstream Contact

- Author: Benjamin Peterson
- Home page: http://pypi.python.org/pypi/six/

Dependencies

Python

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.16.0

install-requires.txt:

six >=1.15.0

Equivalent System Packages

conda:

$ conda install six

macports: install the following packages: py-six

opensuse:

$ sudo zypper install python3-six

void:

$ sudo xbps-install python3-six
See https://repology.org/project/python:six/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.354 slabbe: Sébastien Labbé’s Research code

Description

This SageMath package contains various modules for experimentation with

- discrete dynamical systems
- combinatorics
- digital geometry
- visualization
- miscellaneous development tools

License

GPLv2+

Upstream Contact

https://pypi.org/project/slabbe/

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- $(SAGERUNTIME)

Version Information

requirements.txt:

```
slabbe
```
Equivalent System Packages

See https://repology.org/project/python:slabbe/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.355 snappy: Topology and geometry of 3-manifolds, with a focus on hyperbolic structures

Description

Studying the topology and geometry of 3-manifolds, with a focus on hyperbolic structures.

License

GPLv2+

Upstream Contact

https://pypi.org/project/snappy/

Type

optional

Dependencies

• $(PYTHON)
  • decorator: Python library providing decorators
  • ipython: Interactive computing environment with an enhanced interactive Python shell
  • cypari2: Python interface to the number theory library libpari
  • $(PYTHON_TOOLCHAIN)
  • sagelib

Version Information

requirements.txt:

# Note: As of 2021-01, snappy will pull in cypari (!= cypari2) as a dependency
# if installed as a wheel but will actually use Sage's cypari2.
# cypari contains a statically linked copy of pari and other libraries
# and will remain completely unused (wastes 30M). Snappy is about 165M.
# See :issue:`31180`
snappy
# cypari 2.4.0 has a broken sdist, :issue:`31180`
cypari !=2.4.0

(continues on next page)
# An optional database (110M uncompressed)
snappy_15_knots

## Equivalent System Packages

(none known)

### 4.1.356 snowballstemmer: Stemmer algorithms for natural language processing in Python

#### Description

This package provides 29 stemmers for 28 languages generated from Snowball algorithms.

#### License

BSD-3-Clause

#### Upstream Contact

https://pypi.org/project/snowballstemmer/

This is a pure Python stemming library. If PyStemmer is available, this module uses it to accelerate.

#### Type

standard

#### Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

#### Version Information

package-version.txt:

```
2.2.0
```

install-requires.txt:

```
snowballstemmer >=1.2.1
```

4.1. Details of external packages
Equivalent System Packages

conda:

```
$ conda install snowballstemmer
```

macports: install the following packages: py-snowballstemmer

opensuse:

```
$ sudo zypper install python3-snowballstemmer
```

void:

```
$ sudo xbps-install python3-snowballstemmer
```

See https://repology.org/project/python:snowballstemmer/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.357 soplex: Linear optimization solver using the revised simplex method

Description

SoPlex is an optimization package for solving linear programming problems (LPs) based on an advanced implementation of the primal and dual revised simplex algorithm. It provides special support for the exact solution of LPs with rational input data.

License

Apache License, Version 2.0

Upstream Contact

https://github.com/scipopt/soplex

Type

optional

Dependencies

- $(MP_LIBRARY)
- mpfr: Multiple-precision floating-point computations with correct rounding
- boost_cropped: Portable C++ libraries (subset needed for Sage)
- zlib: Data compression library
- papilo: Parallel presolve for integer and linear optimization
- cmake: A cross-platform build system generator
Version Information

package-version.txt:

602

Equivalent System Packages

conda:

$ conda install soplex

freebsd:

$ sudo pkg install math/SoPlex

See https://repology.org/project/soplex/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.358 soupsieve: A modern CSS selector implementation for Beautiful Soup.

Description

A modern CSS selector implementation for Beautiful Soup.

License

Upstream Contact

https://pypi.org/project/soupsieve/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend
Version Information

package-version.txt:

2.3.2.post1

install-requires.txt:

soupsieve

Equivalent System Packages

conda:

$ conda install soupsieve

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.359 sphinx: Python documentation generator

Description

Sphinx is a tool that makes it easy to create intelligent and beautiful documentation for Python projects (or other documents consisting of multiple reStructuredText sources), written by Georg Brandl. It was originally created to translate the new Python documentation, but has now been cleaned up in the hope that it will be useful to many other projects.

License

Modified BSD; see e.g. its egg-info file for other options

Upstream Contact

• Author: Georg Brandl
• Home Page: http://www.sphinx-doc.org
• see also http://pypi.python.org/pypi/Sphinx

Dependencies

• Jinja2 >= 2.3
• Pygments >= 2.0
• docutils < 0.18
• snowballstemmer >= 1.1
• babel >= 1.3
• setuptools / distribute
• Python
  • GNU patch (shipped with Sage)

**Type**

standard

**Dependencies**

• $(PYTHON)
• $(PYTHON_TOOLCHAIN)
  • docutils: Processing plaintext documentation into useful formats, such as HTML or LaTeX
  • jinja2: General purpose template engine for Python
  • pygments: Generic syntax highlighter
  • snowballstemmer: Stemmer algorithms for natural language processing in Python
  • imagesize: Parser for image file metadata
  • babel: Internationalization utilities for Python
  • alabaster: Default theme for the Sphinx documentation system
  • requests: An HTTP library for Python
  • sphinxcontrib_websupport: Sphinx API for Web apps
  • sphinxcontrib_applehelp: Sphinx extension which outputs Apple help book
  • sphinxcontrib_devhelp: Sphinx extension which outputs Devhelp documents
  • sphinxcontrib_htmlhelp: Sphinx extension which outputs HTML help book
  • sphinxcontrib_jsmath: Sphinx extension which renders display math in HTML via JavaScript
  • sphinxcontrib_qthelp: Sphinx extension which outputs QtHelp documents
  • sphinxcontrib_serializinghtml: Sphinx extension which outputs serialized HTML files
  • packaging: Core utilities for Python packages
  • importlib_metadata: Library to access the metadata for a Python package

**Version Information**

package-version.txt:

```
5.2.3
```

install-requires.txt:

```
sphinx >=5.2, <6
```
Equivalent System Packages

conda:

```
$ conda install sphinx<6,>=5.2
```

gentoo:

```
$ sudo emerge dev-python/sphinx
```

homebrew:

```
$ brew install sphinx-doc
```

macports: install the following packages: py-sphinx

opensuse:

```
$ sudo zypper install python3-Sphinx
```

void:

```
$ sudo xbps-install python3-Sphinx
```

See https://repology.org/project/python:sphinx/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.360 sphinx_basic_ng: A modern skeleton for Sphinx themes.

Description

A modern skeleton for Sphinx themes.

License

Upstream Contact

https://pypi.org/project/sphinx-basic-ng/

Type

standard
External Packages, Release 10.0

Dependencies

- $(PYTHON)
- *sphinx*: Python documentation generator
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
0.0.1a12
```

install-requires.txt:

```
sphinx-basic-ng
```

Equivalent System Packages

conda:

```
$ conda install sphinx-basic-ng
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.361 *sphinx_copybutton*: Add a copy button to each of your code cells.

Description

Add a copy button to each of your code cells.

License

MIT License

Upstream Contact

https://pypi.org/project/sphinx-copybutton/

Type

standard
Dependencies

- $(PYTHON)
- `sphinx`: Python documentation generator
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.5.1

install-requires.txt:

`sphinx-copybutton`

Equivalent System Packages

conda:

$ conda install sphinx-copybutton

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/)

4.1.362 `sphinxcontrib_applehelp`: Sphinx extension which outputs Apple help book

Description

Sphinx extension which outputs Apple help book

License

BSD

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
Version Information

package-version.txt:

| 1.0.2 |

install-requires.txt:

| sphinxcontrib_applehelp >=1.0.2 |

Equivalent System Packages

conda:

| $ conda install sphinxcontrib-applehelp |

macports: install the following packages: py-sphinxcontrib-applehelp

opensuse:

| $ sudo zypper install python3-sphinxcontrib-applehelp |

void:

| $ sudo xbps-install python3-sphinxcontrib-applehelp |

See https://repology.org/project/python:sphinxcontrib-applehelp/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.363 sphinxcontrib_devhelp: Sphinx extension which outputs Devhelp documents

Description

Sphinx extension which outputs Devhelp documents

License

BSD

Type

standard
External Packages, Release 10.0

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.0.2

install-requires.txt:

sphinxcontrib_devhelp >=1.0.2

Equivalent System Packages

conda:

$ conda install sphinxcontrib-devhelp

macports: install the following packages: py-sphinxcontrib-devhelp

void:

$ sudo xbps-install python3-sphinxcontrib-devhelp

See https://repology.org/project/python:sphinxcontrib-devhelp/versions
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.364 sphinxcontrib_htmlhelp: Sphinx extension which outputs HTML help book

Description

Sphinx extension which outputs HTML help book

License

BSD
Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2.0.0

install-requires.txt:

sphinxcontrib_htmlhelp >=1.0.3

Equivalent System Packages

conda:

$ conda install sphinxcontrib-htmlhelp

macports: install the following packages: py-sphinxcontrib-htmlhelp

void:

$ sudo xbps-install python3-sphinxcontrib-htmlhelp

See https://repology.org/project/python:sphinxcontrib-htmlhelp/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.365 sphinxcontrib_jsmath: Sphinx extension which renders display math in HTML via JavaScript

Description

Sphinx extension which renders display math in HTML via JavaScript
License

BSD

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.0.1

install-requires.txt:

sphinxcontrib_jsmath >=1.0.1

Equivalent System Packages

conda:

$ conda install sphinxcontrib-jsmath

macports: install the following packages: py37-sphinxcontrib-jsmath

void:

$ sudo xbps-install python3-sphinxcontrib-jsmath

See https://repology.org/project/python:sphinxcontrib-jsmath/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.366 sphinxcontrib_qthelp: Sphinx extension which outputs QtHelp documents

Description

Sphinx extension which outputs QtHelp documents
License

BSD

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:
1.0.3

install-requires.txt:
sphinxcontrib_qthelp >=1.0.3

Equivalent System Packages

conda:
$ conda install sphinxcontrib-qthelp

macports: install the following packages: py-sphinxcontrib-qthelp

void:
$ sudo xbps-install python3-sphinxcontrib-qthelp

See https://repology.org/project/python:sphinxcontrib-qthelp/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.367 sphinxcontrib_serializinghtml: Sphinx extension which outputs serialized HTML files

Description

Sphinx extension which outputs serialized HTML files
License

BSD

Type

standard

Dependencies

- `${PYTHON}`
- `${PYTHON_TOOLCHAIN}`

Version Information

package-version.txt:

1.1.5

install-requires.txt:

sphinxcontrib_serializinghtml >=1.1.4

Equivalent System Packages

conda:

$ conda install sphinxcontrib-serializinghtml

macports: install the following packages: py-sphinxcontrib-serializinghtml

opensuse:

$ sudo zypper install python3-sphinxcontrib-serializinghtml

void:

$ sudo xbps-install python3-sphinxcontrib-serializinghtml

See https://repology.org/project/python:sphinxcontrib-serializinghtml/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.368 einstein: A package for general relativity

Description

einstein is a package for the numerical solution of the Einstein field equations using the finite element method. It is designed to be flexible and scalable, allowing users to customize the simulation parameters and perform high-precision calculations.

License

GPLv3

Type

standard

Dependencies

- $(PYTHON)
- gfortran: GNU Fortran compiler
- lapack: Linear Algebra Package
- fftw: Fastest Fourier Transform in the West
- mpi4py: Python interface for MPI

Version Information

package-version.txt:

```
1.2.4
```

install-requires.txt:

```
sphinxcontrib_websupport >=1.2.1
```

Equivalent System Packages

conda:

```
$ conda install einstein
```

macports: install the following packages: py-einstein

opensuse:

```
$sudo zypper install python3-einstein
```

See https://repology.org/project/python:einstein/
history/

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.369 sqlalchemy: A database abstraction library

Description

Database Abstraction Library

License

MIT

Upstream Contact

https://pypi.org/project/SQLAlchemy/

Type

optional

Dependencies

Version Information

requirements.txt:

sqlalchemy

Equivalent System Packages

conda:

$ conda install sqlalchemy

macports: install the following packages: py-sqlalchemy

opensuse:

$ sudo zypper install python3-SQLAlchemy

void:

$ sudo xbps-install python3-SQLAlchemy

See https://repology.org/project/python:sqlalchemy/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.370 sqlite: An SQL database engine

Description

SQLite is a software library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine.

License

Public Domain

Upstream contact

- https://www.sqlite.org

Dependencies

- readline

Special Update/Build Instructions

- Use the autoconf version of sqlite.

Type

standard

Dependencies

- readline: Command line editing library

Version Information

package-version.txt:

3.36.0

Equivalent System Packages

arch:

$ sudo pacman -S sqlite3

conda:

$ conda install sqlite

cygwin:
$ apt-cyg install libsqlite3-devel sqlite3

Debian/Ubuntu:

$ sudo apt-get install libsqlite3-dev sqlite3

Fedora/Redhat/CentOS:

$ sudo yum install sqlite-devel sqlite

freebsd:

$ sudo pkg install databases/sqlite3

gentoo:

$ sudo emerge dev-db/sqlite

homebrew:

$ brew install sqlite

macports: install the following packages: sqlite3

nix:

$ nix-env --install sqlite

opensuse:

$ sudo zypper install "pkgconfig(sqlite3)"

slackware:

$ sudo slackpkg install sqlite icu4c

void:

$ sudo xbps-install sqlite-devel

See https://repology.org/project/sqlite/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.371 stack_data: Extract data from python stack frames and tracebacks for informative displays

**Description**

Extract data from python stack frames and tracebacks for informative displays
License
MIT

Upstream Contact
https://pypi.org/project/stack-data/

Type
standard

Dependencies
- $(PYTHON)
- `executing`: Get the currently executing AST node of a frame, and other information
- `asttokens`: Annotate AST trees with source code positions
- `pure_eval`: Safely evaluate AST nodes without side effects
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

```
0.6.1
```

install-requires.txt:

```
stack-data
```

Equivalent System Packages

conda:

```
$ conda install stack_data
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)
4.1.372 suitesparse: A suite of sparse matrix software

Suitesparse is a collection of software to deal with sparse matrix. It is hosted at http://faculty.cse.tamu.edu/davis/suitesparse.html

This spkg does a minimal install of suitesparse disabling the following

-metis
-GraphBLAS (need cmake)
-Mongoose (need cmake)

An external metis package can be used but we just disable its use.

Patches:

- The first patch disable the building of package using cmake.
- The second patch make sure we use sage’s blas/lapack on OS X. By default suitesparse discard any configurations to use the accelerate framework.

The building of metis is disabled by passing MY_METIS_LIB=none to make (any value would have done) We also configure cholmod so it doesn’t require metis by passing CHOLMOD_CONFIG=-DNPARTITION to make.

Other configurations are self explanatory.

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Availability:

http://www.suitesparse.com

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http://www.suitesparse.com

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Licensed under the GNU GENERAL PUBLIC LICENSE, Version 3, 29 June 2007

Type

standard

Dependencies

- $(BLAS)
- gfortran: Fortran compiler from the GNU Compiler Collection
- mpfr: Multiple-precision floating-point computations with correct rounding
- $(MP_LIBRARY)

Version Information

package-version.txt:

5.10.1

Equivalent System Packages

arch:

$ sudo pacman -S suitesparse

conda:

$ conda install suitesparse

cygwin:

$ apt-cyg install libsuitesparseconfig-devel

Debian/Ubuntu:

$ sudo apt-get install libsuitesparse-dev

Fedora/Redhat/CentOS:

$ sudo yum install suitesparse suitesparse-devel

freebsd:

$ sudo pkg install math/suitesparse

gentoo:
**surf: Visualization of algebraic curves, algebraic surfaces and hyperplane sections of surfaces**

**Description**

surf is a tool to visualize some real algebraic geometry: plane algebraic curves, algebraic surfaces and hyperplane sections of surfaces. surf is script driven and has (optionally) a nifty GUI using the Gtk widget set.

This is used by the Singular Jupyter kernel to produce 3D plots.

**License**

GPL version 2 or later

**Upstream Contact**

http://surf.sourceforge.net (although the project is essentially dead)

**Dependencies**

- cups (optional)
- GNU flex Version 2.5 or higher
- GTK+ Version 1.2.0 or higher (optional)
- POSIX Threads
- GNU MP(gmp) Version 2 or higher
- lib-tiff
- lib-jpeg
- zlib
• ps2pdf (optional)

This package is “experimental” because not all of these dependencies are packaged with Sage.

**Type**

experimental

**Dependencies**

• $(MP_LIBRARY)$

**Version Information**

package-version.txt:

```
1.0.6-gcc6
```

**Equivalent System Packages**

openuse:

```
$ sudo zypper install surf
```

See [https://repology.org/project/surf-alggeo/versions](https://repology.org/project/surf-alggeo/versions)

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see [github issue #27330](https://github.com/sagemath/sage/issues/27330)

### 4.1.374 surface_dynamics: dynamics on surfaces (measured foliations, interval exchange transformation, Teichmüller flow, etc)

**Description**

Dynamics on surfaces.

**License**

GPLv2+

**Upstream Contact**

[https://gitlab.com/videlec/surface_dynamics](https://gitlab.com/videlec/surface_dynamics) [https://pypi.org/project/surface-dynamics/](https://pypi.org/project/surface-dynamics/)
Type
optional

Dependencies

- $(PYTHON)
- cysignals: Interrupt and signal handling for Cython
- pplpy: Python interface to the Parma Polyhedra Library
- $(PYTHON_TOOLCHAIN)
- $(SAGERUNTIME)

Version Information

requirements.txt:

```
surface_dynamics
```

Equivalent System Packages

See https://repology.org/project/python:surface-dynamics/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.375 symengine: A C++ symbolic manipulation library

Description

SymEngine is a standalone fast C++ symbolic manipulation library.

License

BSD 3-clause

Upstream Contact

https://github.com/symengine/symengine
Type

optional

Dependencies

- $(MP_LIBRARY)
- arb: Arbitrary-precision floating-point ball arithmetic
- ecm: Elliptic curve method for integer factorization
- fflint: Fast Library for Number Theory
- mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding
- mpfr: Multiple-precision floating-point computations with correct rounding
- cmake: A cross-platform build system generator

Version Information

package-version.txt:

0.8.1

Equivalent System Packages

conda:

$ conda install symengine

freebsd:

$ sudo pkg install math/symengine

gentoo:

$ sudo emerge sci-libs/symengine

macports: install the following packages: symengine

nix:

$ nix-env --install symengine

opensuse:

$ sudo zypper install symengine

See https://repology.org/project/symengine/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1. Details of external packages
4.1.376 symengine_py: Python wrappers for SymEngine

Description

Python wrappers for SymEngine

License

symengine.py is MIT licensed and uses several LGPL, BSD-3 and MIT licensed libraries

Upstream Contact

https://github.com/symengine/symengine.py

Type

experimental

Dependencies

- symengine: A C++ symbolic manipulation library
- $(PYTHON)
- cmake: A cross-platform build system generator
- cython: C-Extensions for Python, an optimizing static compiler
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.8.1.p0

install-requires.txt:

symengine.py >= 0.6.1

Equivalent System Packages

conda:

$ conda install python-symengine

See https://repology.org/project/python:symengine/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.377 symmetrica: Library for representation theory

Description

Symmetrica is a Collection of C routines for representation theory. It is a program developed by Lehrstuhl Mathematik II of the University of Bayreuth. It has routines to handle the following topics:

- ordinary representation theory of the symmetric group and related groups (2/11/04)
- ordinary representation theory of the classical groups
- modular representation theory of the symmetric group
- projective representation theory of the symmetric group
- combinatorics of tableaux
- symmetric functions and polynomials (7/22/04)
- commutative and non commutative Schubert polynomials
- operations of finite groups.
- ordinary representation theory of Hecke algebras of type A_n

For more details check http://www.algoritgm.uni-bayreuth.de/en/research/SYMMETRICA

Updated package on https://gitlab.com/sagemath/symmetrica/-/releases with changes to modernize the source and the build system.

License

Public Domain (see the above web site)

Upstream Contact

- (passed away in 2013) Axel Kohnert - see http://www.mathe2.uni-bayreuth.de/axel/

Type

standard

Dependencies

- xz: General-purpose data compression software
Version Information

package-version.txt:

3.0.1

Equivalent System Packages

arch:

$ sudo pacman -S symmetrica

conda:

$ conda install symmetrica

Debian/Ubuntu:

$ sudo apt-get install libsymmetrica2-dev

Fedora/Redhat/CentOS:

$ sudo yum install symmetrica-devel

freebsd:

$ sudo pkg install math/symmetrica

gentoo:

$ sudo emerge sci-libs/symmetrica

nix:

$ nix-env --install symmetrica

void:

$ sudo xbps-install symmetrica-devel

See https://repology.org/project/symmetrica/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.378 sympow: Computes special values of symmetric power elliptic curve L-functions

Description

SYMPOW is a package to compute special values of symmetric power elliptic curve L-functions. It can compute up to about 64 digits of precision.
License

- See the file src/COPYING

Upstream Contact

SYMPOW does not appear to be maintained any longer. Mark Watkins, the package author, now works at Magma. Previous (possibly still usable) email is watkins@maths.usyd.edu.au

New upstream: https://gitlab.com/rezozer/forks/sympow

Dependencies

- GNU patch

Special Update/Build Instructions

- Some of the code is very dubious, and it is anyone’s guess really what the compiler does with it. For example, the following line exists in src/eulerfactors.c:
  
  if ((HECKE) && (d==1)) return hecke_good(p,ap,m,v);

  But since hecke_good is defined as returning void, it’s hard to know exactly how this code behaves. I would not be surprised by any bugs that might show up. I (David Kirkby) would personally not trust this code much at all.

- This is a difficult package to maintain. A github issue (#9758) has been opened to implement Watkins-Delaunay’s algorithm for computing modular degrees in Sage. Once implemented, it should be possible to remove this package.

- The package is configured such that the data files are in a directory below where ‘sympow’ is installed. If Sage is installed globally, then it will be impossible to create the data files without being root. This has been fixed in the Gentoo Linux distribution. Some information from Christopher can be seen on github issue #9703 This package will generate binary versions of all shipped datafiles, so these will work. However, creating totally new datafiles from scratch will not work.

Type

standard

Dependencies

- pari: Computer algebra system for fast computations in number theory
Version Information

package-version.txt:

2.023.6

Equivalent System Packages

arch:

$ sudo pacman -S sympow

conda:

$ conda install sympow

Debian/Ubuntu:

$ sudo apt-get install sympow

Fedora/Redhat/CentOS:

$ sudo yum install sympow

gentoo:

$ sudo emerge sci-mathematics/sympow

nix:

$ nix-env --install sympow

opensuse:

$ sudo zypper install sympow

void:

$ sudo xbps-install sympow

See https://repology.org/project/sympow/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.379 sympy: Python library for symbolic mathematics

Description

SymPy is a Python library for symbolic mathematics. It aims to become a full-featured computer algebra system (CAS) while keeping the code as simple as possible in order to be comprehensible and easily extensible. SymPy is written entirely in Python and does not require any external libraries, except optionally for plotting support.
Website

https://sympy.org/

License

New BSD: http://www.opensource.org/licenses/bsd-license.php

Upstream Contact

sympy mailinglist: http://groups.google.com/group/sympy

Dependencies

• Python 2.5 or later

Special Update/Build Instructions

• A simple script can be used to ease the updating of the SPKG. See the README.

Type

standard

Dependencies

• $(PYTHON)
  • mpmath: Pure Python library for multiprecision floating-point arithmetic
  • $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.11.1

install-requires.txt:

sympy >=1.6, <2.0

4.1. Details of external packages
**Equivalent System Packages**

conda:

```
$ conda install sympy
```

macports: install the following packages: py-sympy

void:

```
$ sudo xbps-install python3-sympy
```

See [https://repology.org/project/python:sympy/versions](https://repology.org/project/python:sympy/versions)

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see [github issue #29023](https://github.com/sagemath/sage/issues/29023)

### 4.1.380 tachyon: A ray tracing system

**Description**

Tachyon is a ray tracer developed by John E. Stone. Tachyon supports the typical ray tracer features, most of the common geometric primitives, shading and texturing modes, etc. It also supports less common features such as HDR image output, ambient occlusion lighting, and support for various triangle mesh and volumetric texture formats beneficial for molecular visualization (e.g. rendering VMD scenes).

Currently not all of Tachyon’s functionality is exported by the Sage interface.

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**Upstream Contact**

- [http://jedi.ks.usu.edu/~johns/raytracer/](http://jedi.ks.usu.edu/~johns/raytracer/)
- John Stone <johns@ks.usu.edu>
**Dependencies**

This spkg depends on:

- libpng

**Special Update/Build Instructions**

- Delete the scenes directory, which has lots of cool examples.
- Delete the msvc directory, which is also large and not used within Sage.
- The CVS subdirectories are currently (almost) empty, but should otherwise be deleted.
- The upstream files had strange permissions, i.e. some source files were executable, while almost all files weren’t world-readable.
- There’s seems to be some crap like `tachyon.html.tar.gz` and a few `.#*` files I haven’t [yet] deleted, since they’re not that large.
- TODO: Check whether building multi-threaded versions on MacOS X meanwhile works. (This was said to fail with an old beta.)
- TODO: Use `patch` instead of copying over pre-patched files.
- TODO: [Optionally] also install some of the documentation.
- TODO: I doubt the CFLAGS set for AIX and HP-UX won’t get overridden by the created Makefile, but that’s a minor issue. -leif

**Type**

standard

**Dependencies**

- libpng: Bitmap image support

**Version Information**

package-version.txt:

```
0.98.9.p7
```

**Equivalent System Packages**

arch:

```
$ sudo pacman -S tachyon
```

conda:

```
$ conda install tachyon
```

Debian/Ubuntu:

### 4.1. Details of external packages
$ sudo apt-get install tachyon

Fedora/Redhat/CentOS:

$ sudo yum install tachyon tachyon-devel

gentoo:

$ sudo emerge media-gfx/tachyon

nix:

$ nix-env --install tachyon

opensuse:

$ sudo zypper install tachyon

void:

$ sudo xbps-install tachyon

See https://repology.org/project/tachyon/versions, https://repology.org/project/tachyon-opengl/versions

If the system package is installed, ./configure will check whether it can be used.

4.1.381 tdlib: Algorithms for computing tree decompositions

Description

Providing algorithms concerning treedecompositions
website: https://github.com/freetdi/tdlib

License

GNU General Public License v2

SPKG Maintainers

Lukas Larisch (lukas.larisch@kaust.edu.sa)
Upstream Contact

• Lukas Larisch (lukas.larisch@kaust.edu.sa)
• git-repo: https://github.com/freetdi/tdlib

Dependencies

• None

Type

optional

Dependencies

Version Information

package-version.txt:

0.3.1.p0

Equivalent System Packages

arch:

$ sudo pacman -S tdlib

See https://repology.org/project/python:tdlib/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.382 terminado: Tornado websocket backend for the term.js Javascript terminal emulator library

Description

This is a Tornado websocket backend for the term.js Javascript terminal emulator library.

It evolved out of pyxterm, which was part of GraphTerm (as lineterm.py), v0.57.0 (2014-07-18), and ultimately derived from the public-domain Ajaxterm code, v0.11 (2008-11-13) (also on Github as part of QWeb).
Type

standard

Dependencies

- $(PYTHON)
- ptyprocess: Python interaction with subprocesses in a pseudoterminal
- tornado: Python web framework and asynchronous networking library
- $(PYTHON_TOOLCHAIN)
- hatchling: Modern, extensible Python build backend

Version Information

package-version.txt:

0.17.0

install-requires.txt:

terminado >=0.8.3

Equivalent System Packages

conda:

$ conda install terminado

macports: install the following packages: py-terminado

void:

$ sudo xbps-install python3-terminado


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.383 texlive: A comprehensive TeX system

Description

TeX Live is an easy way to get up and running with the TeX document production system. It provides a comprehensive TeX system with binaries for most flavors of Unix, including GNU/Linux, and also Windows. It includes all the major TeX-related programs, macro packages, and fonts that are free software, including support for many languages around the world.

This package installs all texlive packages required to build Sage. If necessary, texlive itself is installed.
License

Various FSF-approved free software licenses. See https://www.tug.org/texlive/copying.html for details.

Upstream Contact

Home page: https://www.tug.org/texlive

Dependencies

- python

Special Update/Build Instructions

This package requires internet access to download texlive packages for the TeX mirrors.

Type

optional

Dependencies

Version Information

Equivalent System Packages

alpine: install the following packages: texlive
arch:

```
$ sudo pacman -S texlive-core texlive-latexextra texlive-langjapanese texlive-langcyrillic
```

Cygwin:

```
$ apt-cyg install texlive
```

Debian/Ubuntu:

```
$ sudo apt-get install texlive-latex-extra texlive-xetex latexmk dvipng tex-gyre␣,
   -texlive-fonts-recommended texlive-lang-cyrillic texlive-lang-english texlive-lang␣,
   -european texlive-lang-french texlive-lang-german texlive-lang-italian texlive-lang␣,
   -langjapanese texlive-lang-polish texlive-lang-portuguese texlive-lang-spanish
```

Fedora/Redhat/CentOS:

```
$ sudo yum install latexmk texlive texlive-collection-latexextra texlive-collection␣,
   -langcyrillic texlive-collection-langeuropean texlive-collection-langfrench texlive␣,
   -collection-langgerman texlive-collection-langitalian texlive-collection-langjapanese␣,
   -texlive-collection-langpolish texlive-collection-langportuguese texlive-collection␣,
   -langspanish
```

4.1. Details of external packages
gentoo:

```
```

macports: install the following packages: texlive

opensuse:

```
$ sudo zypper install texlive
```

slackware:

```
$ sudo slackpkg install texlive
```

void:

```
$ sudo xbps-install texlive
```

See https://repology.org/project/texlive/versions

If the system package is installed, ./configure will check whether it can be used.

### 4.1.384 texttable: Python module for creating simple ASCII tables

**Description**

Python module for creating simple ASCII tables

**License**

MIT License (MIT)

**Upstream Contact**

https://github.com/foutaise/texttable/

**Dependencies**

- python
Special Update/Build Instructions

Type

optional

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.6.7

install-requires.txt:

```
texttable >=1.6.3
```

Equivalent System Packages

conda:

```
$ conda install texttable
```

macports: install the following packages: py-texttable

void:

```
$ sudo xbps-install python3-texttable
```

See https://repology.org/project/texttable/versions, https://repology.org/project/python:texttable/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.385 threejs: JavaScript library to display 3D graphics in the browser

Description

Three.js is a JavaScript library to display 3D graphics in the browser.
License

MIT License

Upstream Contact

Home page: http://threejs.org

Dependencies

None.

Special Update/Build Instructions

None.

Type

standard

Dependencies

Version Information

package-version.txt:

```
r122.p@
```

Equivalent System Packages

conda:

```
$ conda install threejs-sage=122.*
```

See https://repology.org/project/threejs/versions, https://repology.org/project/threejs-sage/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.386 tides: Integration of ODEs

Description

TIDES is a library for integration of ODEs with high precision.
License

GPLv3+

Upstream Contact

- Marcos Rodriguez (marcos@unizar.es)

Dependencies

- gcc
- mpfr
- gmp

Special Update/Build Instructions

minc_tides.patch changes the size of the name of the temporal files, so there is no problem in systems that use long names. Also solves a bug in the inverse function.

Type

optional

Dependencies

- $(MP_LIBRARY)
  - mpfr: Multiple-precision floating-point computations with correct rounding

Version Information

package-version.txt:

2.0.p0

Equivalent System Packages

See https://repology.org/project/tides/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330
4.1.387 tinycss2: A tiny CSS parser

Description
A tiny CSS parser

License

Upstream Contact
https://pypi.org/project/tinycss2/

Type
standard

Dependencies
- $(PYTHON)
- webencodings: Character encoding aliases for legacy web content
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.2.1

install-requires.txt:

 tinycss2

Equivalent System Packages

conda:

$ conda install tinycss2

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.388 toml: Python Library for Tom’s Obvious, Minimal Language

Description
Python Library for Tom’s Obvious, Minimal Language

License
MIT

Upstream Contact
https://pypi.org/project/toml/

Type
standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

0.10.2

install-requires.txt:

toml

Equivalent System Packages

conda:

$ conda install toml

void:

$ sudo xbps-install python3-toml

If the system package is installed, ./configure will check whether it can be used.
4.1.389 tomli: A lil’ TOML parser

Description

A lil’ TOML parser

License

Upstream Contact

https://pypi.org/project/tomli/

Type

standard

Dependencies

• $(PYTHON)
  • pip: Tool for installing and managing Python packages
  • flit_core: Distribution-building parts of Flit. See flit package for more information

Version Information

package-version.txt:

2.0.1

install-requires.txt:

tomli

Equivalent System Packages

conda:

$ conda install tomli

void:

$ sudo xbps-install python3-tomli

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.390 tomlkit: Style preserving TOML library

Description

Style preserving TOML library

License

MIT

Upstream Contact

https://pypi.org/project/tomlkit/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- poetry_core: Poetry PEP 517 Build Backend

Version Information

package-version.txt:

0.11.6

install-requires.txt:

tomlkit

Equivalent System Packages

conda:

$ conda install tomlkit

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.391 topcom: Compute triangulations of point configurations and oriented matroids

Description

TOPCOM is a collection of clients to compute Triangulations Of Point Configurations and Oriented Matroids, resp. The algorithms use only combinatorial data of the point configuration as is given by its oriented matroid. Some basic commands for computing and manipulating oriented matroids can also be accessed by the user.

It was very much inspired by the maple program PUNTOS, which was written by Jesus de Loera. TOPCOM is entirely written in C++, so there is a significant speed up compared to PUNTOS.

License

GPL v2

Upstream Contact

Prof. Dr. Jörg Rambau <Joerg.Rambau@uni-bayreuth.de>
Lehrstuhl für Wirtschaftsmathematik
Raum FAN-D.1.29 (Sekretariat: FAN-D.1.30)
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D-95440 Bayreuth
Germany
Tel: +49-921-55-7350, Fax: +49-921-55-7352
http://www.rambau.wm.uni-bayreuth.de

Dependencies

- gmp, libcdd

Special Update/Build Instructions

See spkg-src

Type

optional
Dependencies

- cddlib: Double description method for polyhedral representation conversion

Version Information

package-version.txt:

1.1.2

Equivalent System Packages

See https://repology.org/project/topcom/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.392 tornado: Python web framework and asynchronous networking library

Description

Python web framework and asynchronous networking library

License

Apache License

Upstream Contact

Home page: http://www.tornadoweb.org

Dependencies

Python

Type

standard
Dependencies

- $(PYTHON)
- certifi: Python package for providing Mozilla’s CA Bundle
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

6.2

install-requires.txt:

tornado >=6.0.4

Equivalent System Packages

conda:

$ conda install tornado

macports: install the following packages: py-tornado

opensuse:

$ sudo zypper install python3-tornado

void:

$ sudo xbps-install python3-tornado

See https://repology.org/project/python:tornado/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.393 tox: tox is a generic virtualenv management and test command line tool

Description

tox is a generic virtualenv management and test command line tool
License
MIT

Upstream Contact
https://pypi.org/project/tox/

Type
standard

Dependencies
- $(PYTHON)
- packaging: Core utilities for Python packages
- six: Python 2 and 3 compatibility utilities
- filelock: A platform independent file lock
- pluggy: plugin and hook calling mechanisms for python
- py: library with cross-python path, ini-parsing, io, code, log facilities
- toml: Python Library for Tom's Obvious, Minimal Language
- virtualenv: Virtual Python Environment builder
- importlib_metadata: Library to access the metadata for a Python package
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

3.27.0

install-requires.txt:

tox >= 3.21.4

Equivalent System Packages

arch:

$ sudo pacman -S python-tox

conda:

$ conda install tox

Debian/Ubuntu:
$ sudo apt-get install tox

Fedora/Redhat/CentOS:

$ sudo yum install tox

freebsd:

$ sudo pkg install tox

gentoo:

$ sudo emerge dev-python/tox

homebrew:

$ brew install tox

macports: install the following packages: py-tox

slackware:

$ sudo slackpkg install tox

void:

$ sudo xbps-install tox

See https://repology.org/project/python:tox/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.394 traitlets: Traitlets Python configuration system

Description
Traitlets Python configuration system

License
BSD

Upstream Contact
https://pypi.org/project/traitlets/
Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)
- ipython_genutils: Vestigial utilities from IPython
- decorator: Python library providing decorators
- six: Python 2 and 3 compatibility utilities
- hatchling: Modern, extensible Python build backend

Version Information

package-version.txt:

```
5.5.0
```

install-requires.txt:

```
traitlets >=4.3.3
```

Equivalent System Packages

conda:

```
$ conda install traitlets
```

macports: install the following packages: py-traitlets

opensuse:

```
$ sudo zypper install python3-traitlets
```

void:

```
$ sudo xbps-install python3-traitlets
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1. Details of external packages
4.1.395 typing_extensions: Backported and Experimental Type Hints for Python 3.5+

Description

Backported and Experimental Type Hints for Python 3.5+

License

PSF

Upstream Contact

https://pypi.org/project/typing-extensions/

Type

standard

Dependencies

- $(PYTHON)
  - flit_core: Distribution-building parts of Flit. See flit package for more information

Version Information

package-version.txt:

4.5.0

install-requires.txt:

```
# According to https://github.com/python/typing_extensions/blob/main/CHANGELOG.md,
# version 4.4.0 adds another Python 3.11 typing backport
typing_extensions >= 4.4.0
```

Equivalent System Packages

conda:

```
$ conda install typing_extensions
```

void:

```
$ sudo xbps-install python3-typing_extensions
```

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.396 tzdata: Provider of IANA time zone data

Description

Provider of IANA time zone data

License

Apache-2.0

Upstream Contact

https://pypi.org/project/tzdata/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

2022.6

install-requires.txt:

tzdata

Equivalent System Packages

conda:

$ conda install tzdata

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.397 tzlocal: Python timezone information for the local timezone

Description

tzinfo object for the local timezone

Type

standard

Dependencies

- $(PYTHON)
- backports_zoneinfo: Backport of the standard library zoneinfo module
- pytz_deprecation_shim: Shims to make deprecation of pytz easier
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

4.2

install-requires.txt:

tzlocal >=2.1

Equivalent System Packages

conda:

$ conda install tzlocal

macports: install the following packages: py-tzlocal

opensuse:

$ sudo zypper install python3-tzlocal

void:

$ sudo xbps-install python3-tzlocal

See https://repology.org/project/tzlocal/versions, https://repology.org/project/python:tzlocal/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.398 urllib3: HTTP library with thread-safe connection pooling, file post, and more.

Description

HTTP library with thread-safe connection pooling, file post, and more.

License

MIT

Upstream Contact

https://pypi.org/project/urllib3/

Type

standard

Dependencies

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

1.26.12

install-requires.txt:

urllib3

Equivalent System Packages

conda:

$ conda install urllib3

void:

$ sudo xbps-install python3-urllib3

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.399 valgrind: Memory error detector, call graph generator, runtime profiler

Description

This is an optional spkg. It supports Linux on x86, x86-64, ppc, ppc64 and ARM as well as Darwin (Mac OS X 10.5 and 10.6) on x86 and x86-64.

Valgrind is an instrumentation framework for building dynamic analysis tools. There are Valgrind tools that can automatically detect many memory management and threading bugs, and profile your programs in detail. You can also use Valgrind to build new tools.

The Valgrind distribution currently includes six production-quality tools: a memory error detector, two thread error detectors, a cache and branch-prediction profiler, a call-graph generating cache and branch-prediction profiler, and a heap profiler. It also includes three experimental tools: a heap/stack/global array overrun detector, a second heap profiler that examines how heap blocks are used, and a SimPoint basic block vector generator. It runs on the following platforms: X86/Linux, AMD64/Linux, ARM/Linux, PPC32/Linux, PPC64/Linux, S390X/Linux, ARM/Android (2.3.x), X86/Darwin and AMD64/Darwin (Mac OS X 10.6 and 10.7).

License

Valgrind is Open Source / Free Software, and is freely available under the GNU General Public License, version 2.

Upstream Contact

- http://www.valgrind.org/
- valgrind-user, valgrind-devel mailing lists

Dependencies

- None

Special Build Instructions

- To build on OS X, you need to use Apple’s compiler. FSF GCC is unsupported.

Patches

- None.

Type

experimental
Dependencies

Version Information

package-version.txt:

3.14.0

Equivalent System Packages

homebrew:

$ brew install valgrind

macports: install the following packages: valgrind

opensuse:

$ sudo zypper install valgrind

void:

$ sudo xbps-install valgrind

See https://repology.org/project/valgrind/versions

However, these system packages will not be used for building Sage because spkg-configure.m4 has not been written for this package; see github issue #27330

4.1.400 vcversioner: Python build system extension to obtain package version from version control

Description

Write a setup.py with no version information specified, and vcversioner will find a recent, properly-formatted VCS tag and extract a version from it.

License

Python Software Foundation License

Upstream Contact

Home page: https://pypi.python.org/pypi/vcversioner/
External Packages, Release 10.0

**Dependencies**

Python, setuptools

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
2.16.0.0.p0
```

install-requires.txt:

```
vcversioner >=2.16.0.0
```

**Equivalent System Packages**

conda:

```
$ conda install vcversioner
```

macports: install the following packages: py-vcversioner

opensuse:

```
$ sudo zypper install python3-vcversioner
```


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

**4.1.401 virtualenv: Virtual Python Environment builder**

**Description**

Virtual Python Environment builder
License

MIT

Upstream Contact

https://pypi.org/project/virtualenv/

Type

standard

Dependencies

- $(PYTHON)
- appdirs: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
- distlib: Distribution utilities
- filelock: A platform independent file lock
- six: Python 2 and 3 compatibility utilities
- importlib_metadata: Library to access the metadata for a Python package
- importlib_resources: Read resources from Python packages
- platformdirs: A small Python module for determining appropriate platform-specific dirs, e.g. a “user data dir”.
- $(PYTHON_TOOLCHAIN)

Version Information

package-version.txt:

20.16.6

install-requires.txt:

virtualenv

Equivalent System Packages

conda:

$ conda install virtualenv

void:

$ sudo xbps-install python3-virtualenv

If the system package is installed, ./configure will check whether it can be used.

4.1. Details of external packages
4.1.402 wcwidth: Measures the displayed width of unicode strings in a terminal

Description
Measures the displayed width of unicode strings in a terminal

License
MIT

Upstream Contact
https://pypi.org/project/wcwidth/

Type
standard

Dependencies
- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
0.2.5

install-requires.txt:
wcwidth >=0.1.7

Equivalent System Packages
conda:
$ conda install wcwidth

macports: install the following packages: py-wcwidth
opensuse:
$ sudo zypper install python3-wcwidth

void:
$ sudo xbps-install python3-wcwidth

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

### 4.1.403 webencodings: Character encoding aliases for legacy web content

**Description**

Character encoding aliases for legacy web content.

**License**

BSD License

**Upstream Contact**

Home Page: https://github.com/gsnedders/python-webencodings

**Dependencies**

Python

**Type**

standard

**Dependencies**

- $(PYTHON)
- $(PYTHON_TOOLCHAIN)

**Version Information**

package-version.txt:

```
0.5.1
```

install-requires.txt:

```
webencodings >=0.5.1
```
Equivalent System Packages

conda:

```
$ conda install webencodings
```

macports: install the following packages: py-webencodings

```
$ sudo zypper install python3-webencodings
```

opensuse:

```
$ sudo zypper install python3-webencodings
```

void:

```
$ sudo xbps-install python3-webencodings
```

See https://repology.org/project/python:webencodings/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.404 wheel: A built-package format for Python

Description

A built-package format for Python

License

MIT

Upstream Contact

https://pypi.org/project/wheel/

Type

standard

Dependencies

- `$({PYTHON})`
  - setuptools: Build system for Python packages
Version Information

package-version.txt:

0.38.4

install-requires.txt:

# :issue:`31050` - version constraint for macOS Big Sur support
wheel >=0.36.2

Equivalent System Packages

conda:

$ conda install wheel

macports: install the following packages: py-wheel
opensuse:

$ sudo zypper install python3-wheel

void:

$ sudo xbps-install python3-wheel

See https://repology.org/project/wheel/versions, https://repology.org/project/python:wheel/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.405 widgetsnbextension: Jupyter notebook extension for interactive HTML widgets

Description

Interactive HTML widgets for Jupyter notebooks.

Type

standard
Dependencies

- `$(PYTHON)`
- `jupyter_packaging: Jupyter Packaging Utilities`
- `$(PYTHON_TOOLCHAIN)`
- `jupyter_core: Jupyter core package`

Version Information

package-version.txt:

| 4.0.3 |

install-requires.txt:

| widgetsnbextension >=3.5.1 |

Equivalent System Packages

arch:

$ sudo pacman -S jupyter-widgetsnbextension

conda:

$ conda install widgetsnbextension

Fedora/Redhat/CentOS:

$ sudo yum install python-widgetsnbextension

freebsd:

$ sudo pkg install devel/py-widgetsnbextension

gentoo:

$ sudo emerge dev-python/widgetsnbextension

macports: install the following packages: py-widgetsnbextension

opensuse:

$ sudo zypper install jupyter-widgetsnbextension

void:

$ sudo xbps-install python3-jupyter_widgetsnbextension


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023
4.1.406 xz: General-purpose data compression software

Description
XZ Utils is free general-purpose data compression software with a high compression ratio.

License
Some parts public domain, other parts GNU LGPLv2.1, GNU GPLv2, or GNU GPLv3.

Upstream Contact
http://tukaani.org/xz/

Dependencies
Type
standard

Version Information
package-version.txt:
5.2.5

Equivalent System Packages
conda:
$ conda install xz
cygwin:
$ apt-cyg install xz
Debian/Ubuntu:
$ sudo apt-get install xz-utils
Fedora/Redhat/CentOS:
$ sudo yum install xz
homebrew:
$ brew install xz
macports: install the following packages: xz
opensuse:

```bash
$ sudo zypper install xz
```
slackware:

```bash
$ sudo slackpkg install xz
```
void:

```bash
$ sudo xbps-install xz
```

See [https://repology.org/project/xz/versions](https://repology.org/project/xz/versions)
If the system package is installed, `./configure` will check whether it can be used.

### 4.1.407 zeromq: A modern networking library

**Description**

A modern networking library. Also known as 0mq or zmq. The same API is provided by [http://www.crossroads.io](http://www.crossroads.io), though we currently use the [http://www.zeromq.org](http://www.zeromq.org) implementation.

**License**

LGPLv3+

**Upstream Contact**

http://www.zeromq.org

**Dependencies**

A working compiler.

**Special Update/Build Instructions**

N/A

**Type**

standard
Dependencies

Version Information

package-version.txt:

4.3.4

Equivalent System Packages

arch:

$ sudo pacman -S zeromq

conda:

$ conda install zeromq

cygwin:

$ apt-cyg install libzmq-devel

Debian/Ubuntu:

$ sudo apt-get install libzmq3-dev

Fedora/Redhat/CentOS:

$ sudo yum install zeromq zeromq-devel

freebsd:

$ sudo pkg install net/libzmq4

gentoo:

$ sudo emerge net-libs/zeromq

homebrew:

$ brew install zeromq

macports: install the following packages: zmq-devel

opensuse:

$ sudo zypper install "pkgconfig(libzmq)"

void:

$ sudo xbps-install zeromq-devel

See https://repology.org/project/zeromq/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.408  zipp: A pathlib-compatible zipfile object wrapper

Description
A pathlib-compatible Zipfile object wrapper. A backport of the Path object.

License
MIT License

Upstream Contact
Home page: https://github.com/jaraco/zipp

Dependencies
Python, Setuptools

Type
standard

Dependencies
- $(PYTHON)
- vcversioner: Python build system extension to obtain package version from version control
- $(PYTHON_TOOLCHAIN)

Version Information
package-version.txt:
3.11.0

install-requires.txt:
zip >=0.5.2

Equivalent System Packages
conda:
$ conda install zipp

macports: install the following packages: py-zipp
void:
$ sudo xbps-install python3-zipp

See https://repology.org/project/python:zipp/versions

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see github issue #29023

4.1.409 zlib: Data compression library

Description

Massively Spiffy Yet Delicately Unobtrusive Compression Library (Also Free, Not to Mention Unencumbered by Patents)

License

- Modified BSD.

Upstream Contact

- http://www.zlib.net/

Special Update/Build Instructions

Patches

- cygwin_symbols.patch: remove undefined symbols on Cygwin.

Type

standard

Dependencies

Version Information

package-version.txt:

1.2.11.p0
Equivalent System Packages

conda:
$ conda install zlib

cygwin:
$ apt-cyg install zlib-devel

Debian/Ubuntu:
$ sudo apt-get install libz-dev

Fedora/Redhat/CentOS:
$ sudo yum install zlib-devel

homebrew:
$ brew install zlib

macports: install the following packages: zlib

opensuse:
$ sudo zypper install "pkgconfig(zlib)"

slackware:
$ sudo slackpkg install zlib

void:
$ sudo xbps-install zlib-devel

See https://repology.org/project/zlib/versions

If the system package is installed, ./configure will check whether it can be used.
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