External Packages

Release 9.6

The Sage Development Team

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The Sage distribution includes most programs and libraries on which Sage depends. It installs them automatically if it does not find equivalent system packages.

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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
- **argcomplete**: Bash tab completion for argparse
- **argon2_cffi**: The secure Argon2 password hashing algorithm
- **attrs**: Decorator for Python classes with attributes
- **babel**: Internationalization utilities for Python
- **backcall**: Specifications for callback functions
- **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_normalizer**: 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
- **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
• 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
• elliptic_curves: Databases of elliptic curves
• entrypoints: Discover and load entry points from installed Python packages
• fflas_ffpack: Dense linear algebra over word-size finite fields
• filelock: A platform independent file lock
• flint: Fast Library for Number Theory
• flintqs: Multi-polynomial quadratic sieve for integer factorization
• 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
• 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, including the C, C++ and Fortran compiler
• 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
• graphs: A database of combinatorial graphs
• gsl: The GNU Scientific Library
• 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_sphinx: Jupyter Sphinx Extension
• jupyterlab_pygments: Pygments theme using JupyterLab CSS variables
• 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
• **MemoryAllocator**: An extension class to allocate memory easily with cython.
• **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
• **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
• **parso**: A Python parser
• **patch**: Applies diffs and patches to files
• **pcre**: Perl-compatible regular expressions library
• **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
• 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: 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
• 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
• pyrsistent: Persistent data structures in Python
• python3: The Python programming language
• pythran: Ahead of Time compiler for numeric kernels
• pytz: Timezone definitions for Python
• pyzmq: Python bindings for the zmq networking library
• qhull: Compute convex hulls, Delaunay triangulations, Voronoi diagrams
• r: A free software environment for statistical computing and graphics
• 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.
•phinx: Python documentation generator
• 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
• 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
• testpath: Testing utilities for filesystem-related code
• threejs: JavaScript library to display 3D graphics in the browser
• toml: Python Library for Tom’s Obvious, Minimal Language
• toml: A lil’ TOML parser
• 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+
• tzlocal: Python timezone 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
• zn_poly: C library for polynomial arithmetic in Z/nZ[x]
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
- **_recommended**: Represents system packages recommended for additional functionality
- **admcycles**: Computation in the tautological ring of the moduli space of curves
- **barvinok**: Projections of integer point sets of parametric polytopes
- **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
- **cddlp**: Solver for semidefinite programs
- **cunningham_tables**: List of the prime numbers occurring in the Cunningham table
- **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_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
- **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
• **e_antic**: Real embedded number fields
• **ffmpeg**: ffmpeg video converter
• **fricas**: A general purpose computer algebra system
• **froby**: Computations on monomial ideals
• **gap_jupyter**: Jupyter kernel for GAP
• **gap_packages**: A collection of GAP packages
• **git**: Version control system
• **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
• **jupyter_packaging**: Jupyter Packaging Utilities
• **jupyterlab**: An extensible environment for interactive and reproducible computing
• **jupyterlab_widgets**: A JupyterLab extension for Jupyter/IPython widgets
• **kenzo**: Construct topological spaces and compute homology groups
• **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
• **Mathics3**: 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
• **mpfrcx**: Arithmetic of univariate polynomials over arbitrary precision real or complex numbers
- nibabel: Access a multitude of neuroimaging data formats
- ninja_build: A build system with a focus on speed
- 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
- ore_algebra: Ore algebra
- 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
- 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-embdedded graphs
- polylib: Operations on unions of polyhedra
- 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
- pysingular: A basic Python interface to Singular
- pytest: Simple powerful testing with Python
- python_igraph: Python bindings for igraph
• **pyx**: Generate PostScript, PDF, and SVG files in Python
• **r_jupyter**: Jupyter kernel for R
• **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
• **singular_jupyter**: Jupyter kernel for Singular
• **sip**: Python extension module generator for C and C++ libraries
• **sirocco**: Compute topologically certified root continuation of bivariate polynomials
• **slabbe**: Sébastien Labbé’s Research code
• **snappy**: Topology and geometry of 3-manifolds, with a focus on hyperbolic structures
• **sqlalchemy**: A database abstraction library
• **surface_dynamics**: dynamics on surfaces (measured foliations, interval exchange transformation, Teichmüller flow, etc)
• **symengine**: A C++ symbolic manipulation library
• **symengine_py**: Python wrappers for SymEngine
• **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
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
- **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
- **qepcad**: Quantifier elimination by partial cylindrical algebraic decomposition
- **Sage**: Open Source Mathematics Software: Sage categories and basic rings
- **Sage**: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses
- **scipoptsuite**: Mixed integer programming solver
- **surf**: Visualization of algebraic curves, algebraic surfaces and hyperplane sections of surfaces
- **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 www.4ti2.de.

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

Dependencies

GLPK, GMP.

Type

optional
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

Version Information

Equivalent System Packages

arch:

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

conda:

$ conda install gettext autoconf automake libtool

cygwin:

$ apt-cyg install gettext-devel autoconf automake libtool

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

$ sudo yum install gettext-devel autoconf automake libtool pkg-config

freebsd:

$ sudo pkg install gettext autoconf automake libtool pkg-config

gentoo:

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

homebrew:

$ brew install gettext autoconf automake libtool pkg-config

nix:

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

opensuse:

$ sudo zypper install gettext-tools autoconf automake libtool pkgconfig

slackware:

$ sudo slackpkg install autoconf automake libtool

void:
$ sudo xbps-install gettext autoconf automake libtool gettext-devel xtools mk-configure

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

4.1.3 _prereq: Represents system packages required for installing SageMath from source

Description

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

Type

standard

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 python39-urllib3 python39 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 perl perl-ExtUtils-MakeMaker tar gcc gcc-c++ findutils which diffutils perl-IPC-Cmd

freebsd:

$ sudo pkg install gmake automake bash dash python

gentoo:


(continues on next page)
homebrew:
nix:

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

opensuse:

```bash
$ sudo zypper install binutils make m4 perl python3 tar bc which glibc-locale-base gcc␣
˓→gcc-c++ ca-certificates gzip findutils diffutils
```

slackware:

```bash
$ 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 gettext-tools libcroco libxml2 cyrus-sasl
```

void:

```bash
$ 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.

### 4.1.4 _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

**Version Information**

**Equivalent System Packages**

Debian/Ubuntu:

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

homebrew:

```bash
$ brew install texinfo
```

macports: install the following packages: texinfo

If the system package is installed, ./configure will check whether it can be used.
4.1.5 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/

Type

optional

Version Information

requirements.txt:

```
admcycles
```

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 trac ticket #27330

4.1.6 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

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

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

4.1.7 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

Version Information

package-version.txt:

1.4.4

install-requires.txt:

appdirs

Equivalent System Packages

void:

$ sudo xbps-install python3-appdirs

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

4.1.8 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

Version Information

package-version.txt:

0.1.2

install-requires.txt:

appnope >=0.1.0

Equivalent System Packages

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 trac ticket #29023

4.1.9 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/
External Packages, Release 9.6

Type

standard

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

genoot:

$ 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.
4.1.10 argcomplete: Bash tab completion for argparse

Description

Bash tab completion for argparse

License

Apache Software License

Upstream Contact

https://pypi.org/project/argcomplete/

Type

standard

Version Information

package-version.txt:

1.12.3

install-requires.txt:

argcomplete

Equivalent System Packages

void:

$ sudo xbps-install python3-argcomplete

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

4.1.11 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

Version Information

package-version.txt:

```
20.1.0
```

install-requires.txt:

```
argon2-cffi
```

Equivalent System Packages

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 trac ticket #29023

4.1.12 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

Dependencies

Python

Type

standard

Version Information

package-version.txt:

21.2.0

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 trac ticket #29023
4.1.13 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 modellized.

License

- GPL 3.0

Upstream Contact

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

Dependencies

- Python
- CMake
- Cython
- ncurses
- graphviz must be installed from your distro, and available in the path.

Special Update/Build Instructions

- None

Type

experimental

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 trac ticket #27330

4.1.14 babel: Internationalization utilities for Python

Description

A collection of tools for internationalizing Python applications.

Upstream Contact

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

Type

standard

Version Information

package-version.txt:

2.9.1

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 trac ticket #29023

4.1. Details of external packages
4.1.15 backcall: Specifications for callback functions

Description

Specifications for callback functions passed in to an API

Type

standard

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 trac ticket #29023

4.1.16 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

optional

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 trac ticket #27330

4.1.17 beautifulsoup4: Screen-scraping library

Description

Screen-scraping library

License

MIT

Upstream Contact

https://pypi.org/project/beautifulsoup4/
External Packages, Release 9.6

Type
standard

Version Information

package-version.txt:
4.10.0

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 trac ticket #29023

4.1.18 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

Version Information

package-version.txt:

0.4.1

install-requires.txt:

beniget

Equivalent System Packages

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 trac ticket #29023

4.1.19 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/
Dependencies

- None

Type

optional

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 trac ticket #27330

4.1.20 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

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 trac ticket #27330

4.1.21 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

Dependencies
Python, html5lib, six
**Type**

standard

**Version Information**

package-version.txt:

4.1.0

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 trac ticket #29023

**4.1.22 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 Junntila 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.
Dependencies

None

Type

optional

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 trac ticket #27330

4.1.23 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

Dependencies

None

Type

standard

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

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

### 4.1.24 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

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:

$ 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.
4.1.25 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/

Dependencies

• None

Type

optional

Version Information

package-version.txt:

1.1

Equivalent System Packages

arch:

$ sudo pacman -S buckygen

opensuse:

$ 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 trac ticket #27330
4.1.26 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>

Dependencies

None

Special Update/Build Instructions

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

```
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.

Type

standard

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.

4.1.27 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

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 coind-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.

### 4.1.28 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

**Version Information**

package-version.txt:

```
3.3.4
```

**Equivalent System Packages**

conda:

```
$ conda install ccache
```

dhomebrew:

```
$ 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 trac ticket #27330

4.1.29 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 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

Version Information

package-version.txt:

0.94m
**Equivalent System Packages**

arch:

```bash
$ sudo pacman -S cddlib
```

conda:

```bash
$ conda install cddlib
```

cygwin:

```bash
$ apt-cyg install cddlib-devel cddlib-tools
```

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

```bash
$ sudo yum install cddlib
```

freebsd:

```bash
$ sudo pkg install math/cddlib
```

gentoo:

```bash
$ sudo emerge sci-libs/cddlib
```

homebrew:

macports: install the following packages: cddlib

```bash
$ nix-env --install cddlib
```

opensuse:

```bash
$ sudo zypper install cddlib-tools "pkgconfig(cddlib)"
```

void:

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

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

If the system package is installed, `./configure` will check whether it can be used.
4.1.30 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

Dependencies
Python, setuptools

Type
standard

Version Information
package-version.txt:

| 2021.10.8 |

install-requires.txt:

certifi >=2020.6.20

Equivalent System Packages
conda:

$ conda install certifi

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

$ sudo zypper install python3-certifi

void:

$ sudo xbps-install python3-certifi

See 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 trac ticket #29023
4.1.31 cffi: Foreign Function Interface for Python calling C code

Description

development website: https://foss.heptapod.net/pypy/cffi
documentation website: https://cffi.readthedocs.io/en/latest/
PyPI page: https://pypi.org/project/cffi/

License

MIT

Upstream Contact

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

Type

standard

Version Information

package-version.txt:

1.15.0

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 trac ticket #29023

4.1. Details of external packages
4.1.32 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

Version Information

package-version.txt:

2.0.4

install-requires.txt:

charset-normalizer

Equivalent System Packages

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 trac ticket #29023

4.1.33 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

Dependencies

- None

Patches

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

Type

standard

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.

### 4.1.34 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

#### Dependencies

- curl
- zlib
- bzip2
- xz
Type

standard

Version Information

package-version.txt:

3.21.0

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:

4.1. Details of external packages
$ sudo zypper install cmake

slackware:

$ sudo slackpkg install cmake

void:

$ sudo xbps-install cmake

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

4.1.35 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/
• Email: cocoa@dima.unige.it
• Website: http://cocoa.dima.unige.it/
• Releases: http://cocoa.dima.unige.it/cocoalib/

Type

experimental

Version Information

package-version.txt:

0.99564
Equivalent System Packages

freebsd:

$ sudo pkg install math/cocoalib

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 trac ticket #27330

4.1.36 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

Dependencies

N/A

Type

standard

Version Information

package-version.txt:

20140630.p0
External Packages, Release 9.6

Equivalent System Packages

arch:

```bash
$ sudo pacman -S sage-data-combinatorial_designs
```

conda:

```bash
$ 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 trac ticket #27330

4.1.37 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.

Dependencies

None

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
Version Information

package-version.txt:

888d18eb851f892097a0a683c01e3a95db863495

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 trac ticket #27330

4.1.38 conway_polynomials: Tables of Conway polynomials over finite fields

Description

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

Dependencies

- Sage library

Upstream contact

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

Type

standard

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 trac ticket #27330

4.1. Details of external packages
4.1.39 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

Dependencies

None

Special Update/Build Instructions

The source package was created by running

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

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.

4.1.40 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 PyOb-
ject 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

Version Information

package-version.txt:
1.1.0

install-requires.txt:
cppy

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 trac ticket #29023

4.1.41 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

Version Information

package-version.txt:

5.6.8

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 trac ticket #27330

4.1.42 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>

Dependencies

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

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 trac ticket #27330
4.1.43 cunningham_tables: List of the prime numbers occurring in the Cunningham table

The script read_cunningham_prime_numbers.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

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 trac ticket #27330

4.1.44 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/

Dependencies

None listed.
Special Update/Build Instructions

None.

Type

standard

Version Information

package-version.txt:

7.62.0.p0

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

4.1.45 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/

License

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

Dependencies

- GNU patch
- GSL
- GLPK

Special Update/Build Instructions

- cvxopt.h.patch: Fix building with GCC on Solaris.
- setup.py.patch: look for libraries and includes in $SAGE_LOCAL instead of /usr. Add fortran, blas,… libraries if needed. Build with GSL and GLPK support.
- remove doc/html/, as it can be rebuilt by invoking ‘sage -sh’ and running ‘make html’ in doc/
- TODO: Add more tests in spkg-check
- TODO: one might want to enhance the code to allow other Sage random sources, at the moment only GSL is used in CVXOPT-1.1.3 spkg, apparently it will need an unclear to me “with seed(…)” construct.
**External Packages, Release 9.6**

**Type**

standard

**Version Information**

package-version.txt:

1.2.7

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 trac ticket #29023

4.1.46 **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/
**Dependencies**

- python
- setuptools
- six

**Type**

standard

**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

void:

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

See [https://repology.org/project/cycler/versions](https://repology.org/project/cycler/versions), [https://repology.org/project/python:cycler/versions](https://repology.org/project/python:cycler/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 trac ticket #29023

**4.1.47 cylp: A Python interface for CLP, CBC, and CGL**

**Description**

A Python interface for CLP, CBC, and CGL
License

Eclipse Public License

Upstream Contact

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

Type

optional

Version Information

package-version.txt:

0.91.4

install-requires.txt:

cylp

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 trac ticket #29023

4.1.48 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
Dependencies

- Python
- Cython
- PARI
- cysignals

Type

standard

Version Information

package-version.txt:

2.1.2

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 trac ticket #29023

4.1.49 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

Dependencies

- Python
- Cython
- PARI (optional)

Type

standard

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 trac ticket #29023

4.1.50 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 additio- nally 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

Dependencies

- Python

Type

standard

Version Information

package-version.txt:

0.29.28

install-requires.txt:

cython >=0.29.21, <1.0

Equivalent System Packages

conda:

$ conda install cython

freebsd:

$ sudo pkg install lang/cython

homebrew:

$ 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 trac ticket #29023
4.1.51  d3js: 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/

Dependencies

None.

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

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 trac ticket #27330
4.1.52 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

Dependencies

None

Patches

• None

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
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 trac ticket #27330

4.1.53 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

Dependencies

None

Special Update/Build Instructions

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

Type

optional
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 trac ticket #27330

4.1.54 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

Version Information

package-version.txt:

2021.10.1

install-requires.txt:

database-knotinfo
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 trac ticket #29023

4.1.55 database_kohel: Database of modular and Hilbert polynomials

Description

Database of modular and Hilbert polynomials.

Upstream Contact

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

Type

optional

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 trac ticket #27330

4.1.56 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

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

**SPKG Maintainers**

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

**Dependencies**

• None

**Type**

optional

**Version Information**

package-version.txt:

```
1.0
```

**Equivalent System Packages**

See [https://repology.org/project/database-mutation-class/versions](https://repology.org/project/database-mutation-class/versions)

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

### 4.1.57 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*10^(-9).

**Dependencies**

• Sage library
Type

optional

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 trac ticket #27330

4.1.58 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

Dependencies

None

Patches

None

Type

optional
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 trac ticket #27330

4.1.59 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

Dependencies

None

Patches

None

Type

optional

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 trac ticket #27330

4.1.60 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>

Dependencies

Special Update/Build Instructions

List patches that need to be applied and what they do

Type

optional
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 trac ticket #27330

4.1.61 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/

Dependencies

- Python
- Six

Type

standard

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 trac ticket #29023

4.1.62 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

Version Information

package-version.txt:

```
1.5.1
```

install-requires.txt:

```
debugpy
```
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 trac ticket #29023

4.1.63 decorator: Python library providing decorators

Description

Better living through Python with decorators

Type

standard

Version Information

package-version.txt:

5.0.9

install-requires.txt:

decorator >=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 trac ticket #29023
4.1.64 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

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 trac ticket #27330

4.1.65 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/

Dependencies

• pip

Special Update/Build Instructions

None.

Type

standard

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 trac ticket #29023

4.1. Details of external packages
4.1.66 distlib: Distribution utilities

Description
Distribution utilities

License
Python license

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

Type
standard

Version Information
package-version.txt:

| 0.3.4 |

install-requires.txt:

| distlib |

Equivalent System Packages

void:

$ sudo xbps-install python3-distlib

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

4.1.67 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/

Dependencies

None

Special Update/Build Instructions

None

Type

standard

Version Information

package-version.txt:

0.17.1

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 trac ticket #29023

4.1.68 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:

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

**Type**

optional

**Version Information**

package-version.txt:

```
2.11.3.p0
```

install-requires.txt:

```
dot2tex >=2.11.3
```

**Equivalent System Packages**

arch:

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

macports: install the following packages: dot2tex

See https://repology.org/project/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 trac ticket #29023

**4.1.69 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.
External Packages, Release 9.6

Upstream Contact

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

Type

optional

Version Information

package-version.txt:

0.1.9

Equivalent System Packages

conda:

$ conda install libeantic

See 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 trac ticket #27330

4.1.70  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 http://trac.sagemath.org/sage_trac/ticket/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

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:

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

gentoo:

```bash
$ sudo emerge dev-lisp/ecls
```

homebrew:

```bash
$ brew install ecl
```

macports: install the following packages: ecl

nix:

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

void:

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

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

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

### 4.1.71 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 $\mathbb{Q}$ 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

Dependencies

- PARI
- NTL
- FLINT

Type

standard

Version Information

package-version.txt:

20210625

Equivalent System Packages

arch:

$ sudo pacman -S eclib

conda:

$ conda install eclib

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

$ sudo yum install eclib eclib-devel

freebsd:

$ sudo pkg install math/eclib

gentoo:

$ sudo emerge sci-mathematics/eclib[flint]

nix:

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

4.1.72 ecm: Elliptic curve method for integer factorization

Description

GMP-ECM - Elliptic Curve Method for Integer Factorization
Sources can be obtained from http://gforge.inria.fr/projects/ecm/

License

LGPL V3+

Upstream Contact

• ecm-discuss@lists.gforge.inria.fr (requires subscription)

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 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

**Version Information**

package-version.txt:

7.0.4.p2

**Equivalent System Packages**

conda:

$ conda install ecm

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

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

freebsd:

$ sudo pkg install math/gmp-ecm

macports: install the following packages: gmp-ecm

nix:

$ nix-env --install ecm

void:

$ 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.

**4.1.73 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

Dependencies

- sqlite
- python

Type

standard

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 trac ticket #27330
4.1.74  **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

**Version Information**

package-version.txt:

0.3

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 trac ticket #29023
4.1.75 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

SPKG Repository

https://bitbucket.org/malb/fflas-ffpack-spkg

Upstream Contact

• <ffpack-devel@googlegroups.com>

Dependencies

• Givaro
  • a BLAS implementation such as openblas

Patches

• bash.patch: fix shebang line to “#!/usr/bin/env bash”

Type

standard

Version Information

package-version.txt:

2.4.3.p0
**Equivalent System Packages**

**arch:**

```bash
$ sudo pacman -S fflas-ffpack
```

**conda:**

```bash
$ conda install fflas-ffpack
```

**Debian/Ubuntu:**

```bash
$ sudo apt-get install fflas-ffpack
```

**Fedora/Redhat/CentOS:**

```bash
$ sudo yum install fflas-ffpack-devel
```

**freebsd:**

```bash
$ sudo pkg install math/fflas-ffpack
```

**gentoo:**

```bash
$ sudo emerge sci-libs/fflas-ffpack
```

**nix:**

```bash
$ nix-env --install fflas-ffpack
```

**opensuse:**

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

**void:**

```bash
$ sudo xbps-install fflas-ffpack
```

See [https://repology.org/project/fflas-ffpack/versions](https://repology.org/project/fflas-ffpack/versions)

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

### 4.1.76 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

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.

4.1.77 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

Version Information
package-version.txt:
3.6.0

install-requires.txt:
filelock

Equivalent System Packages
void:

$ sudo xbps-install python3-filelock

If the system package is installed, ./configure will check whether it can be used.
4.1.78 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

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:

$ sudo yum install flint flint-devel

freebsd:

$ 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

opensuse:

$ 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.

4.1.79 flintqs: Multi-polynomial quadratic sieve for integer factorization

Description
This is William Hart’s GPL’d highly optimized multi-polynomial quadratic sieve for integer factorization:

http://www.friedspace.com/QS/

See also http://www.maths.warwick.ac.uk/~masfaw/preprint.html
See also the repository: https://github.com/sagemath/FlintQS

Type
standard

Version Information
	package-version.txt:

1.0.p0
Equivalent System Packages

arch:

$ sudo pacman -S flintqs

conda:

$ conda install flintqs

Debian/Ubuntu:

$ sudo apt-get install flintqs

freebsd:

$ sudo pkg install math/flintqs

genoot:

$ sudo emerge sci-mathematics/flintqs

nix:

$ nix-env --install flintqs

void:

$ sudo xbps-install FlintQS

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

4.1.80  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

Version Information

package-version.txt:

3.4.0

install-requires.txt:

flit-core

Equivalent System Packages

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 trac ticket #29023

4.1.81 fonttools: Tools to manipulate font files

Description

Tools to manipulate font files

License

MIT

Upstream Contact

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

Type

standard
Version Information

package-version.txt:

| 4.28.4 |

install-requires.txt:

| fonttools |

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 trac ticket #29023

4.1.82 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

Dependencies

- gmp
- mpfr

Type

standard
Version Information

package-version.txt:

5.4.1

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

opensuse:

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

void:

$ 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.

4.1.83 fpylll: Python interface for FPLLL

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

Dependencies

- Cython
- fplll
- Sage (optional)
- NumPy (optional)

Type

standard

Version Information

package-version.txt:

0.5.6

install-requires.txt:

fplll >=0.5.5, <=0.5.6

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 trac ticket #29023
4.1.84 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/

Dependencies

See the dependencies file.

Type

standard
Version Information

package-version.txt:

2.10.4

Equivalent System Packages

conda:

$ conda install freetype

cygwin:

$ apt-cyg install libfreetype-devel

Debian/Ubuntu:

$ sudo apt-get install libfreetype6-dev

freebsd:

$ sudo pkg install print/freetype2

homebrew:

$ brew install freetype

macports: install the following packages: freetype

nix:

$ nix-env --install freetype

opensuse:

$ sudo zypper install "pkgconfig(freetype2)"

slackware:

$ 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.
4.1.85 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/

Dependencies
  • ecl

Type
optional

Version Information
package-version.txt:

```
1.3.7.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 trac ticket #27330

4.1.86 frobby: Computations on monomial ideals

Description
The software package Frobby 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

Dependencies

• GMP built with support for C++

Special Update/Build instructions

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

Type

optional

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 trac ticket #27330

4.1.87 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

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 trac ticket #27330

4.1.88 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

Dependencies

- Readline
- GMP

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

Version Information

text:

4.11.1
Equivalent System Packages

arch:

```bash
$ sudo pacman -S gap
```

conda:

```bash
$ conda install gap-defaults
```

Debian/Ubuntu:

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

freebsd:

```bash
$ sudo pkg install math/gap
```

nix:

```bash
$ nix-env --install gap
```

See [https://repology.org/project/gap/versions](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 trac ticket #27330

### 4.1.89 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, meataxe, 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](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

Jean Michel <jmichel@math.jussieu.fr> http://webusers.imj-prg.fr/~jean.michel/

Special Update/Build Instructions

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

Patches

None

Dependencies

None

Type

experimental

Version Information

package-version.txt:

04jul17
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 trac ticket #27330

4.1.90 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

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 trac ticket #29023
4.1.91 gap_packages: A collection of GAP packages

Description

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

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)

liealgb - 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

**Version Information**

package-version.txt:

4.11.1

**Equivalent System Packages**

conda:

```bash
$ 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 trac ticket #27330

**4.1.92 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

**Version Information**

package-version.txt:

0.5.2

install-requires.txt:

gast
Equivalent System Packages

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 trac ticket #29023

4.1.93 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

Dependencies

None.

Special Update/Build Instructions

None.

Patches

• cygwin64.patch: let libgc build on Cygwin64.

Type

standard
**External Packages, Release 9.6**

### 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
```

**gentoo:**

```
$ 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](https://repology.org/project/boehm-gc/versions)

If the system package is installed, `./configure` will check whether it can be used.
4.1.94 gcc: The GNU Compiler Collection, including the C, C++ and Fortran compiler

Description
The GNU Compiler Collection, including the C, C++ and Fortran compiler.

License
GPL version 2 or version 3

Upstream Contact
https://gcc.gnu.org/

Type
standard

Version Information
package-version.txt:

11.3.0

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-fortran

freebsd:

$ sudo pkg install lang/gcc9

homebrew:

$ brew install gcc

4.1. Details of external packages
External Packages, Release 9.6

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.

4.1.95  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

Version Information

package-version.txt:

8.2
**Equivalent System Packages**

conda:

homebrew:

```bash
$ brew install gdb
```

macports: install the following packages: gdb

opensuse:

```bash
$ sudo zypper install gdb
```

void:

```bash
$ 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 trac ticket #27330

### 4.1.96 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

**Version Information**

package-version.txt:

```
2.23
```
External Packages, Release 9.6

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.

4.1.97 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: http://gf2x.gforge.inria.fr/
License

- GNU GPLv2+.

Upstream Contact

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

Dependencies

- None

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
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.

4.1.98 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

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

gentoo:

$ sudo emerge sci-mathematics/gfan

nix:

4.1. Details of external packages
$ nix-env --install gfan

opensuse:

$ sudo zypper install gfan

void:

$ sudo xbps-install gfan

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

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

### 4.1.99 gfortran: Fortran compiler from the GNU Compiler Collection

**Description**

The GNU Compiler Collection, including the C, C++ and Fortran compiler. This particular package is meant to only make gfortran available.

**License**

GPL version 2 or version 3

**Upstream Contact**


**Dependencies**

- zlib
- GMP
- MPFR
- MPC

**Special Update/Build Instructions**

None.
Type

standard

Version Information

package-version.txt:

11.3.0

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

4.1. Details of external packages
See https://repology.org/project/gfortran/versions
If the system package is installed, ./configure will check whether it can be used.

4.1.100 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

• Bernard Parisse: http://www-fourier.ujf-grenoble.fr/~parisse/giac.html
• 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

Version Information

package-version.txt:

1.6.0.47p3.p0

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:

$ sudo pkg install math/giacxcas

nix:

$ nix-env --install giac

opensuse:

$ sudo zypper install giac-devel

void:

$ sudo xbps-install giac-devel

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

If the system package is installed, ./configure will check whether it can be used.
4.1.101 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

Version Information

Equivalent System Packages

conda:

   $ conda install git

cygwin:

   $ apt-cyg install git

Debian/Ubuntu:

   $ sudo apt-get install git

Fedora/Redhat/CentOS:

   $ sudo yum install git

freebsd:

   $ 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.

4.1.102 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

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

gentoo:

$ sudo emerge sci-libs/givaro

freebsd:

$ sudo pkg install math/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.

4.1.103 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.

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

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.
4.1.104 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/

Dependencies

zlib

Special Update/Build Instructions

None.

Type

optional

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-configure.m4 has not been written for this package; see trac ticket #27330

4.1.105 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

Version Information

package-version.txt:

6.2.1

Equivalent System Packages

conda:

$ conda install gmp

cygwin:

$ apt-cyg install libgmp-devel

Debian/Ubuntu:

$ sudo apt-get install libgmp-dev

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

freebsd:

$ sudo pkg install math/gmp

gentoo:

$ 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.

### 4.1.106 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
Version Information

package-version.txt:

```
2.1.1
```

install-requires.txt:

```
gmpy2 >=2.1.0
```

Equivalent System Packages

conda:

```
$ conda install gmpy2
```

macports: install the following packages: py-gmpy2

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

void:


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

4.1.107 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

Version Information

package-version.txt:

0.0.10.p0

Equivalent System Packages

Debian/Ubuntu:

$ sudo apt-get install pari-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.

4.1.108 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.
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.

Dependencies

N/A

Type

standard

Version Information

package-version.txt:

20210214.p0

Equivalent System Packages

arch:

$ sudo pacman --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 trac ticket #27330
4.1.109 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

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:

```bash
$ nix-env --install graphviz
```

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.

### 4.1.110 gsl: The GNU Scientific Library

**Description**

The GNU Scientific Library

Website: http://www.gnu.org/software/gsl/

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**

- http://www.gnu.org/software/gsl/

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.
Dependencies

- None - GSL does not depend on any other Sage package to compile, link and pass all of GSL’s self-tests. Despite that fact, BLAS is listed as a dependency. (It comes with its own CBLAS implementation that is e.g. used when running the GSL test suite during installation; however, the Sage library only uses it as a fall-back, if e.g. BLAS library is not present.)

Special Update/Build Instructions

Type

standard

Version Information

package-version.txt:

2.7

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

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](https://repology.org/project/gsl/versions)

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

### 4.1.111 html5lib: An HTML parser

**Description**

HTML parser based on the WHATWG HTML specification.

**License**

MIT License

**Upstream Contact**


**Dependencies**

Python, webencodings, six

**Type**

standard
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 trac ticket #29023

4.1.112 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

4.1. Details of external packages
External Packages, Release 9.6

Dependencies

- None for the purposes of Sage, but in general gettext.

Special Update/Build Instructions

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

Type

standard

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.

4.1.113 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

Version Information

package-version.txt:

3.2

install-requires.txt:

idna

Equivalent System Packages

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 trac ticket #29023

4.1.114 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

Version Information

package-version.txt:

0.9.7

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

freebsd:

$ sudo pkg install math/igraph

genoo:

$ sudo emerge dev-libs/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.
4.1.115 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

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:
4.1.116  **imagesize: Parser for image file metadata**

**Description**

It parses image files’ header and return image size.

**Type**

standard

**Version Information**

package-version.txt:

```
1.2.0
```

install-requires.txt:

```
imagesize >=1.1.0
```
**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 trac ticket #29023

### 4.1.117 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

**Dependencies**

- GMP
- a BLAS implementation such as openblas
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

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.

4.1.118 importlib_metadata: Library to access the metadata for a Python package

Description
importlib_metadata is a library to access the metadata for a Python package. It is intended to be ported to Python 3.8.

License
Apache Software License

Upstream Contact
Home page: http://importlib-metadata.readthedocs.io/

Dependencies
Python, Setuptools, zipp

Type
standard

Version Information
package-version.txt:
4.8.2

install-requires.txt:
importlib_metadata >=1.7.0
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 trac ticket #29023

4.1.119 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

Version Information

package-version.txt:
5.2.2

install-requires.txt:
importlib-resources
**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 trac ticket #29023

### 4.1.120 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.


**License**

GPL-3+ (info/*.c comments in the source repository)

**Type**

optional

**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
```

gentoo:
$ 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.

4.1.121 ipykernel: IPython Kernel for Jupyter

Description

This package provides the IPython kernel for Jupyter.

Type

standard

Version Information

package-version.txt:

6.6.0

install-requires.txt:

ipykernel >=5.2.1
Equivalent System Packages

conda:

```bash
$ conda install ipykernel
```

macports: install the following packages: py-ipykernel

void:

```bash
$ sudo xbps-install python3-ipython_ipykernel
```

See 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 trac ticket #29023

4.1.122 ipympl: Matplotlib Jupyter Extension

Description

Matplotlib Jupyter Extension

License

BSD License

Upstream Contact

https://pypi.org/project/ipympl/

Type

optional

Version Information

requirements.txt:

```text
ipympl
```

install-requires.txt:

```text
ipympl
```
External Packages, Release 9.6

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 trac ticket #29023

4.1.123 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

Type

standard

Version Information

package-version.txt:

7.29.0

install-requires.txt:

ipython >=7.13.0
**Equivalent System Packages**

conda:

```bash
$ conda install ipython
```

homebrew:

```bash
$ brew install ipython
```

macports: install the following packages: py-ipython

```bash
$ sudo port install python3-ipython
```

opensuse:

```bash
$ sudo zypper install python3-ipython
```

void:

```bash
$ sudo xbps-install python3-ipython
```

See [https://repology.org/project/ipython/versions](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 trac ticket #29023

### 4.1.124 ipython_genutils: Vestigial utilities from IPython

**Description**

Vestigial utilities from IPython

**Type**

standard

**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

See https://repolgy.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 trac ticket #29023

4.1.125 ipywidgets: Interactive HTML widgets for Jupyter notebooks and the IPython kernel

Description

Interactive HTML widgets for Jupyter notebooks and the IPython kernel.

Type

standard

Version Information

package-version.txt:

7.6.5

install-requires.txt:

ipywidgets >=7.5.1

Equivalent System Packages

conda:

$ conda install ipywidgets

macports: install the following packages: py-ipywidgets
void:

$ sudo xbps-install python3-jupyter_ipywidgets

See https://repolgy.org/project/python:ipython-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 trac ticket #29023
4.1.126 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

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](https://repology.org/project/isl/versions)

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

### 4.1.127 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

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 trac ticket #29023

4.1.128 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
External Packages, Release 9.6

Upstream Contact

Author: Pocoo Team <http://pocoo.org>
Homepage: http://jinja.pocoo.org/

Dependencies

- Python (>= 2.4)
- setuptools (or distribute)
- Pygments (according to ‘spkg/standard/deps’)
- docutils (dito, as a note only)

Special Update/Build Instructions

None. (Just make sure its prerequisites are new enough in Sage, to avoid downloads during the build / installation.)

Type

standard

Version Information

package-version.txt:

```
2.11.2
```

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

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see trac ticket #29023
4.1.129 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

- Bob Hanson
- e-mail: hansonr@stolaf.edu
- Homepage: https://www.stolaf.edu/people/hansonr/
- Development page: https://github.com/BobHanson/Jmol-SwingJS
- Download page: https://sourceforge.net/projects/jmol/files/Jmol/

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

Version Information

package-version.txt:

14.29.52
**Equivalent System Packages**

arch:

```bash
$ sudo pacman -S jmol
```

conda:

```bash
$ conda install jmol
```

macports: install the following packages: jmol

nix:

```bash
$ nix-env --install jmol
```

opensuse:

```bash
$ sudo zypper install jmol
```

void:

```bash
$ sudo xbps-install jmol
```

See [https://repology.org/project/jmol/versions](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 trac ticket #27330

### 4.1.130 jsonschema: Python implementation of JSON Schema

**Description**

jsonschema is an implementation of JSON Schema for Python

**License**

MIT License

**Upstream Contact**


**Dependencies**

- Python
- setuptools
- attrs
- importlib_metadata
- pyrsistent
### Type

standard

### Version Information

package-version.txt:

| 4.3.2 |

install-requires.txt:

| jsonschema >=3.2.0 |

### Equivalent System Packages

conda:

```
$ conda install jsonschema
```

macports: install the following packages: py-jsonschema

opensuse:

```
$ sudo zypper install python3-jsonschema
```

void:

```
$ 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 [trac ticket #29023](https://trac.sagemath.org/ticket/29023)

#### 4.1.131 jupymake: A Python wrapper for the polymake shell

### Description

The Python module JuPyMake provides an interface to polymake.

### License

- GPL v2
External Packages, Release 9.6

Upstream Contact

https://github.com/polymake/JuPyMake

Dependencies

- pip
- polymake

Special Update/Build Instructions

Type

optional

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 trac ticket #29023

4.1.132 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 kernelpath entrypoint for installing kerspecs for use with Jupyter frontends.
Type

standard

Version Information

package-version.txt:

7.1.0

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 trac ticket #29023

4.1.133 jupyter_core: Jupyter core package

Description

Jupyter core package. A base package on which Jupyter projects rely.

Type

standard
Version Information

package-version.txt:
4.9.1

install-requires.txt:
  jupyter_core >=4.6.3

Equivalent System Packages

conda:
  $ conda install jupyter_core

macports: install the following packages: py-jupyter_core
  opensuse:
  $ sudo zypper install python3-jupyter-core

void:
  $ 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 trac ticket #29023

4.1.134 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

Version Information

package-version.txt:
0.2.4

install-requires.txt:
jupyter-jsmol

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 trac ticket #29023

4.1.135 jupyter_packaging: Jupyter Packaging Utilities

Description
Jupyter Packaging Utilities

License
BSD

Upstream Contact
https://pypi.org/project/jupyter-packaging/

Type
optional

Version Information

requirements.txt:
jupyter-packaging

install-requires.txt:
jupyter-packaging
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 trac ticket #29023

4.1.136 jupyter_sphinx: Jupyter Sphinx Extension

Description

Jupyter Sphinx Extension

License

BSD

Upstream Contact

https://pypi.org/project/jupyter-sphinx/

Type

standard

Version Information

package-version.txt:

0.3.2

install-requires.txt:

jupyter-sphinx

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 trac ticket #29023

4.1.137 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/

Dependencies

- Python
- setuptools
- jupyter_core
- jupyter_client

Type

optional

Version Information

requirements.txt:

```text
jupyterlab ~= 3.3
# See :trac:`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 trac ticket #27330

4.1. Details of external packages
4.1.138 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

Version Information

package-version.txt:

0.1.2

install-requires.txt:

jupyterlab-pygments

Equivalent System Packages

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 trac ticket #29023

4.1.139 jupyterlab_widgets: A JupyterLab extension for Jupyter/IPython widgets

Description

A JupyterLab extension for Jupyter/IPython widgets.
License

BSD License

Upstream Contact

Home page: https://github.com/jupyter-widgets/ipywidgets

Dependencies

- jupyterlab
- nodejs

Type

optional

Version Information

requirements.txt:

```
jupyterlab-widgets
```

Equivalent System Packages

macports: install the following packages: py-jupyterlab_widgets

See https://repology.org/project/jupyterlab-widgets/versions

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

4.1.140 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
External Packages, Release 9.6

Upstream Contact

- https://github.com/gheber/kenzo
- https://github.com/miguelmarco/kenzo/

Dependencies

- ECL (Embedded Common Lisp)

Type

optional

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 trac ticket #27330

4.1.141 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

Version Information

package-version.txt:

1.3.2

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 trac ticket #29023

4.1.142 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

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 trac ticket #27330

4.1.143 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

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/.Lexplicit_formula.h.swp
  src/include/.Lvalue.h.swp
  src/include/._.DS_Store
  src/include/.DS_Store
  src/include/Lexplicit_formula.h.swap.crap
  src/include/Lvalue.h.bak
  src/src/Makefile.old
  src/src/.Makefile.old.swp
  src/src/._.DS_Store
  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 *default* 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 CXXFLAGS64 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

**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.

### 4.1.144 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

Dependencies

None.

Special Update/Build Instructions

None.

Type

standard

Version Information

package-version.txt:

7.6.10

Equivalent System Packages

arch:

$ sudo pacman -S libatomic_ops

conda:

$ conda install libatomic_ops

cygwin:

$ apt-cyg install libatomic_ops-devel

Debian/Ubuntu:

$ sudo apt-get install libatomic-ops-dev

Fedora/Redhat/CentOS:

$ sudo yum install libatomic_ops libatomic_ops-devel

freebsd:
$ sudo pkg install devel/libatomic_ops

gentoo:
$ sudo emerge dev-libs/libatomic_ops

homebrew:
$ brew install libatomic_ops

macports: install the following packages: libatomic_ops
openuse:
$ sudo zypper install "pkgconfig(atomic_ops)"

slackware:
$ sudo slackpkg install libatomic_ops

void:
$ sudo xbps-install libatomic_ops-devel

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

4.1.145 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)
External Packages, Release 9.6

**Type**

standard

**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

gentoo:

$ 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.
4.1.146 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
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.
4.1.147 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
- Pierre Joye (http://blog.thepimp.net)
- http://libgd.bitbucket.org/

Dependencies
- libpng
- freetype
- iconv

Special Update/Build Instructions
See spkg-src script.

Type
standard

Version Information
package-version.txt:

2.3.2
**Equivalent System Packages**

alpine: install the following packages: gd

```bash
$ sudo pacman -S gd
```

conda:

```bash
$ conda install libgd
```

cygwin:

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

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

```bash
$ sudo yum install gd gd-devel
```

freebsd:

```bash
$ sudo pkg install graphics/gd
```

gentoo:

```bash
$ sudo emerge media-libs/gd
```

homebrew:

```bash
$ brew install gd
```

macports: install the following packages: gd2

```bash
$ nix-env --install gd
```

nix:

```bash
$ nix-env --install gd
```

opensuse:

```bash
$ sudo zypper install gd "pkgconfig(gdlib)"
```

slackware:

```bash
$ sudo slackpkg install gd fontconfig libXpm libX11 libxcb libXau libXdmc
```

void:

```bash
$ 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.
4.1.148 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

Version Information

Equivalent System Packages

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

```bash
$ sudo pacman -S graphviz
```

conda:

```bash
$ conda install graphviz
```

cygwin:

```bash
$ apt-cyg install graphviz
```

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

```bash
$ sudo yum install graphviz
```

freebsd:

```bash
$ sudo pkg install graphics/graphviz
```

homebrew:
$ brew install graphviz
macports: install the following packages: graphviz
nix:
$nix-env --install graphviz
opensuse:
$sudo zypper install graphviz
void:
$sudo xbps-install graphviz

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

4.1.149 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)

Dependencies

• gc
Type

standard

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.
4.1.150 liblzma: General-purpose data compression software

Description

This package 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/

Dependencies

Type

standard

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:
4.1.151 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

Version Information

Equivalent System Packages

Debian/Ubuntu:

$ sudo apt-get install libnauty-dev

Fedora/Redhat/CentOS:

$ sudo yum install libnauty-devel

homebrew:

$ brew install nauty

macports: install the following packages: nauty

void:

$ sudo xbps-install nauty-devel

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

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

4.1.152 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

License

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Upstream Contact

The Xiph.org mailing lists - see http://lists.xiph.org/mailman/listinfo

Dependencies

This spkg provides dependencies for

- the Sage library

Special Update/Build Instructions

- No changes went into src.

Type

optional

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)"

4.1. Details of external packages
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 trac ticket #27330

4.1.153 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

Dependencies

This spkg depends on:

• libz

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 -lpng are patched to look for -lpng16 instead.

**Type**

standard

**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

opensuse:

```
$ sudo zypper install "pkgconfig(libpng16)"
```

slackware:

```
$ sudo slackpkg install libpng
```

void:

```
$ sudo xbps-install libpng-devel
```

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

If the system package is installed, ./configure will check whether it can be used.
4.1.154 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

Version Information

package-version.txt:

1.1.0

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.
4.1.155 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

License

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Upstream Contact

The Xiph.org mailing lists - see http://lists.xiph.org/mailman/listinfo

Dependencies

This spkg depends on

• libogg

• libpng

This spkg provides dependencies for

• the Sage library
Special Update/Build Instructions

- No changes went into src.

Type

experimental

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

opensuse:

$ 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 trac ticket #27330

4.1.156 libxml2: XML parser and toolkit

Description

XML C parser and toolkit
License

MIT

Upstream Contact

http://www.xmlsoft.org/index.html

Type

optional

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](https://repology.org/project/libxml2/versions)
If the system package is installed, ./configure will check whether it can be used.

### 4.1.157 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_IKhiQI](https://groups.google.com/forum/#!msg/sage-devel/kTxgPSqrbUM/5Txj3_IKhiQI) and [https://lists.debian.org/debian-legal/2007/07/msg00120.html](https://lists.debian.org/debian-legal/2007/07/msg00120.html)

**Upstream Contact**

Matthias Köppe, UC Davis, CA, USA

**Dependencies**

GMP.

**Type**

optional
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 trac ticket #27330

4.1.158 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 subsystems, 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

External Packages, Release 9.6

Dependencies

• readline
• ncurses
• bison (not included in this package or in Sage!)

Type

experimental

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-config.m4 has not been written
for this package; see trac ticket #27330

4.1.159 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.)
External Packages, Release 9.6

Type

standard

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.
4.1.160 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

**Version Information**

**Equivalent System Packages**

alpine: install the following packages: clang
arch:

```sh
$ sudo pacman -S clang
```

cygwin:

```sh
$ apt-cyg install clang
```

Debian/Ubuntu:

```sh
$ sudo apt-get install clang
```

Fedora/Redhat/CentOS:

```sh
$ sudo yum install clang
```

freebsd:

```sh
$ sudo pkg install devel/llvm
```

gentoo:

---

4.1. Details of external packages 211
$ sudo emerge sys-devel/clang

homebrew:

$ brew install llvm

macports: install the following packages: clang
nix:

$ nix-env --install clang

openbsd: 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.

### 4.1.161 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

**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

gentoo:

$ sudo emerge sci-mathematics/lrcalc

nix:

$ nix-env --install lrcalc

void:

$ sudo xbps-install lrcalc-devel

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

If the system package is installed, ./configure will check whether it can be used.
4.1.162 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

Version Information

package-version.txt:

2.1

install-requires.txt:

lrcalc ~=2.1

Equivalent System Packages

conda:

$ conda install python-lrcalc

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

4.1.163 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 mcgill 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

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.

### 4.1.164 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

**Dependencies**

- libPNG

**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

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

4.1. Details of external packages
4.1.165 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

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

gentoo:
$ 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.

### 4.1.166 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

**Dependencies**

Python, setuptools
Type
standard

Version Information

package-version.txt:

1.1.1

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 trac ticket #29023

4.1.167 Mathics3: A general-purpose computer algebra system.

Description

A general-purpose computer algebra system.

License

GPL
Upstream Contact

https://pypi.org/project/Mathics3/

Type

optional

Version Information

package-version.txt:

4.0.0

install-requires.txt:

Mathics3

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 trac ticket #29023

4.1.168 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
Version Information

package-version.txt:

1.2.4

install-requires.txt:

Mathics-Scanner

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 trac ticket #29023

4.1.169 mathjax: A JavaScript library for displaying mathematical formulas

Description

MathJax is a JavaScript library for displaying mathematical formulas.
MathJax is used by the Jupyter notebook and the Sphinx documentation.

License

Apache License, version 2.0

Upstream Contact

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

Dependencies

None.

Special Update/Build Instructions

None.

Patches

Type

standard

Version Information

package-version.txt:

2.7.4.p0

Equivalent System Packages

conda:

$ conda install mathjax

opensuse:

$ sudo zypper install mathjax

void:

$ sudo xbps-install mathjax

See 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 trac ticket #27330

4.1.170 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: 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

Version Information

package-version.txt:

3.5.1

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:

```
$ conda install "matplotlib>=3.5.1"
```

macports: install the following packages: py-matplotlib

opensuse:

```
$ sudo zypper install python3-matplotlib
```

void:

```
$ 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 trac ticket #29023

**4.1.171 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/](https://pypi.org/project/matplotlib-inline/)

**Type**

standard

**Version Information**

package-version.txt:

```
0.1.2
```

install-requires.txt:

```
matplotlib-inline
```
Equivalent System Packages

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 trac ticket #29023

4.1.172 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

Dependencies

- ECL (Embedded Common Lisp)

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

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:

4.1. Details of external packages
$ 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 trac ticket #27330

4.1.173 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/mcqd

Dependencies

None

Type

optional

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/mcqd/versions

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

4.1.174 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

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 trac ticket #27330
4.1.175 MemoryAllocator: 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

Dependencies

- Cython

Type

standard

Version Information

package-version.txt:

0.1.1

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 trac ticket #29023
4.1.176 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

Dependencies

Python, Cython, Pip

Type

standard

Version Information

package-version.txt:

0.8.4

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 trac ticket #29023
4.1.177 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/

Dependencies

None

Patches

None

Type

experimental

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 trac ticket #27330
4.1.178 mpc: Arithmetic of complex numbers with arbitrarily high precision and correct rounding

Description

From http://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 http://www.multiprecision.org/mpc.
The MPC team can be contacted via the MPC mailing list:
mpc-discuss@lists.gforge.inria.fr

Dependencies

- MPIR
- MPFR

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

Version Information

package-version.txt:

1.1.0
Equivalent System Packages

conda:

$ conda install mpc

cygwin:

$ apt-cyg install libmpc-devel

Debian/Ubuntu:

$ sudo apt-get install libmpc-dev

Fedora/Redhat/CentOS:

$ sudo yum install libmpc libmpc-devel

freebsd:

$ sudo pkg install math/mpc

gentoo:

$ sudo emerge dev-libs/mpc

homebrew:

$ brew install libmpc

nix:

$ nix-env --install libmpc

opensuse:

$ sudo zypper install mpc-devel

void:

$ 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.

4.1.179 mpfi: 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
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 http://mpfi.gforge.inria.fr/
The MPFI team can be contacted via the MPFI mailing list: mpfi-users@lists.gforge.inria.fr

Dependencies

- GMP
- MPFR

Type

standard

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](https://repology.org/project/mpfi/versions)

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

### 4.1.180 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/](http://mpfr.org/)

The MPFR team can be contacted via the MPFR mailing list: mpfr@loria.fr
Dependencies

- GMP/MPIR
- GNU patch

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

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:

```
```

4.1. Details of external packages
$ 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.

4.1.181 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
**Version Information**

package-version.txt:

0.5

**Equivalent System Packages**

opensuse:

$ sudo zypper install mpfrcx-devel

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

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

### 4.1.182 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/

**Dependencies**

- Python

**Type**

standard
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 trac ticket #29023

4.1.183 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

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.

4.1.184 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

Version Information

package-version.txt:

0.5.9

install-requires.txt:

nbclient

Equivalent System Packages

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 trac ticket #29023
4.1.185 nbconvert: Converting Jupyter Notebooks

Description

jupyter nbconvert converts notebooks to various other formats via Jinja templates.

Type

standard

Version Information

package-version.txt:

6.4.4

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 trac ticket #29023

4.1.186 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

Version Information

package-version.txt:

5.1.3

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 trac ticket #29023

4.1.187 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

Dependencies

None

Special Update/Build Instructions

None

Type

standard

Version Information

package-version.txt:
6.0.p0

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.

4.1.188 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

Version Information
package-version.txt:
1.5.4
install-requires.txt:
nest-asyncio
Equivalent System Packages

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 trac ticket #29023

4.1.189 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

Version Information

package-version.txt:

```
2.6.3
```

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
```

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 trac ticket #29023

## 4.1.190 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

### 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 trac ticket #27330
4.1.191 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

Upstream Contact
https://ninja-build.org/

Dependencies
None

Type
optional

Version Information
package-version.txt:
1.8.2

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:

```bash
$ sudo pkg install devel/ninja
```

gentoo:

```bash
$ sudo emerge dev-util/ninja
```

homebrew:

```bash
$ brew install ninja
```

macports: install the following packages: ninja

```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.

### 4.1.192 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

**Dependencies**

- Python
**Type**

optional

**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 trac ticket #27330

### 4.1.193 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/

**Dependencies**

- nodeenv
**Type**
optional

**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](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 trac ticket #27330

### 4.1.194 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/](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

Dependencies

- GMP/MPIR
- boost

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

Version Information

package-version.txt:

3.8.10

Equivalent System Packages

conda:

$ conda install 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 trac ticket #27330

4.1. Details of external packages
4.1.195 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

Version Information

package-version.txt:

6.4.10

install-requires.txt:

notebook >=6.1.1

Equivalent System Packages

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 trac ticket #29023

4.1.196 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

Dependencies

- Python
- setuptools
- nbformat
- nbconvert
- six
- pandoc_attributes

Type

optional

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 trac ticket #29023
4.1.197 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/

Dependencies

• gmp
  • gf2x

Special Update/Build Instructions

• None

Type

standard

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

genoo:

$ sudo emerge dev-libs/ntl

homebrew:

$ brew install ntl

macports: install the following packages: ntl

nix:

$ nix-env --install ntl

opensuse:

$ 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.

4.1.198 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
External Packages, Release 9.6

Dependencies

• GNU patch
• Python
• Lapack
• Blas
• Atlas
• Fortran

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

Version Information

package-version.txt:

1.21.4

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

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see trac ticket #29023
4.1.199 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

Version Information

package-version.txt:

0.3.20

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.

4.1.200 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

Version Information

package-version.txt:

3.0.2

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

freebsd:

$ sudo pkg install security/openssl

homebrew:

$ brew install openssl

macports: install the following packages: openssl

nix:

4.1. Details of external packages
$ nix-env --install openssl

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

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.

4.1.201 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 properities; 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, mmezzaroeba

Dependencies
• None
Type

optional

Version Information

requirements.txt:

```
git+https://github.com/mkauers/ore_algebra@cfcb386f2cc1d3e044c71dfb149444355b16d775
...#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 trac ticket #27330

4.1.202 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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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/

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SPKG Maintainers

Simon A. King <simon.king@uni-jena.de>

Upstream Contact

Simon A. King <simon.king@uni-jena.de> David J. Green <david.green@uni-jena.de>

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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 greatful 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

Version Information

package-version.txt:

3.3.2

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 trac ticket #29023

4.1.203 packaging: Core utilities for Python packages

Description

Core utilities for Python packages

Type

standard

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

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

4.1.204 palettable: Color palettes for Python

Description

Color palettes for Python

License

Upstream Contact

https://pypi.org/project/palettable/

Type

optional

Version Information

package-version.txt:

3.3.0

install-requires.txt:

palettable
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 trac ticket #29023

4.1.205 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

Version Information

package-version.txt:

2.11
**Equivalent System Packages**

**arch:**

```bash
$ sudo pacman -S palp
```

**conda:**

```bash
$ conda install palp
```

**Debian/Ubuntu:**

```bash
$ sudo apt-get install palp
```

**Fedora/Redhat/CentOS:**

```bash
$ sudo yum install palp
```

**nix:**

```bash
$ nix-env --install palp
```

**void:**

```bash
$ sudo xbps-install palp
```

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

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

**4.1.206 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.

**Type**

optional

**Version Information**

**Equivalent System Packages**

**alpine:** install the following packages: pandoc

**arch:**

```bash
$ sudo pacman -S pandoc
```

**conda:**

```bash
```
$ 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](https://repology.org/project/pandoc/versions)

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

### 4.1.207 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

Dependencies

- Python
- setuptools
- pandocfilters

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

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 trac ticket #29023
4.1.208 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

Dependencies
- Python

Special Update/Build Instructions
Download the last release from https://pypi.python.org/pypi/pandocfilters

Type
standard

Version Information
package-version.txt:

1.4.3

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

4.1.209 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
Version Information

package-version.txt:

2.13.3

Equivalent System Packages

arch:

$ sudo pacman -S pari pari-galdata pari-seadata pari-elldata pari-galpol

conda:

$ conda install pari 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:

$ 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


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

### 4.1.210 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

**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.

4.1.211 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/

Dependencies

None (package contains data files only)

Type

standard

Version Information

package-version.txt:

20080411.p0

Equivalent System Packages

arch:

$ sudo pacman -S pari-galdata

conda:

$ conda install pari-galdata
Fedora/Redhat/CentOS:

```bash
$ sudo yum install pari-galdata
```

freebsd:

```bash
$ sudo pkg install pari_galdata
```

opensuse:

```bash
$ sudo zypper install pari-galdata
```

void:

```bash
$ 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.

### 4.1.212 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
Version Information

package-version.txt:

20180625

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.

4.1.213 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

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 trac ticket #29023

4.1.214 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).

Upstream Contact

http://pari.math.u-bordeaux.fr/

Dependencies

- Installation: None
- Runtime: PARI/GP

Type

optional

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.
4.1.215 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

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.

### 4.1.216 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/

#### Dependencies

None (package contains data files only)

#### Type

standard

#### 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](https://repology.org/project/pari-seadata-small/versions)

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

### 4.1.217 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

**Version Information**

*package-version.txt:*

```
0.8.2
```

*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](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 [trac ticket #29023](https://trac.sagemath.org/ticket/29023)

### 4.1.218 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**


Submit bugs: [http://savannah.gnu.org/bugs/?func=additem&group=patch](http://savannah.gnu.org/bugs/?func=additem&group=patch)

Mailing lists: bug-patch@gnu.org

**Dependencies**

None
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

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.

4.1.219 pcre: Perl-compatible regular expressions library

Description
Perl-compatible regular expressions library.

License
BSD License; see LICENCE (sic) at the root of the original tarball.

Upstream Contact
Mailing list at https://lists.exim.org/mailman/listinfo/pcre-dev

Dependencies
None listed.

Special Update/Build Instructions
None applicable (see README at tarball’s root).

Type
standard

Version Information
package-version.txt:
8.40.p2
Equivalent System Packages

conda:

$ conda install pcre

cygwin:

$ apt-cyg install libpcre-devel

Debian/Ubuntu:

$ sudo apt-get install libpcre3-dev

Fedora/Redhat/CentOS:

$ sudo yum install pcre pcre-devel

freebsd:

$ sudo pkg install devel/pcre

homebrew:

$ brew install pcre

macports: install the following packages: pcre

opensuse:

$ sudo zypper install "pkgconfig(libpcre)" "pkgconfig(libpcreposix)"

..."pkgconfig(libpcrecpp)"

slackware:

$ sudo slackpkg install pcre

void:

$ sudo xbps-install pcre-devel

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

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

4.1.220 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

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:

```bash
$ nix-env --install pdf2svg
```

opensuse:

```bash
$ 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.
4.1.221 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

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 ...

Fedora/Redhat/CentOS:

$ sudo yum install perl-ExtUtils-Embed perl-File-Slurp perl-JSON perl-PerlTerm-ReadLine-Gnu ...
perl-TermReadKey perl-XML-Writer perl-XML-LibXML perl-XML-LibXSLT

freebsd:

$ sudo pkg install textproc/p5-XML-Writer textproc/p5-XML-LibXML textproc/p5-XML-LibXSLT ...
devel/p5-File-Slurp converters/p5-JSON textproc/p5-SVG devel/p5-Term-ReadKey

gentoo:

$ sudo emerge XML-Writer XML-LibXML XML-LibXSLT File-Slurp dev-perl/Term-ReadLine-Gnu ...
dev-perl/TermReadKey JSON SVG

gentoo:

void:

$ sudo xbps-install perl-File-Slurp perl-JSON perl-SVG perl-Term-ReadKey perl-XML ...
XML-LibXML perl-XML-LibXSLT perl-XML-Writer

If the system package is installed, ./configure will check whether it can be used.
4.1.222 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

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

gentoo:

$ sudo emerge dev-perl/MongoDB

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

4.1.223 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

Dependencies

readline

Type

optional

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:

$ 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

freebsd:

$ 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.

4.1.224 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

Dependencies

- GNU patch
- Python

Type

standard
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 trac ticket #29023

4.1.225 phitigra: A graph editor for SageMath/Jupyter

Description

A graph editor for SageMath/Jupyter

License

Upstream Contact

https://pypi.org/project/phitigra/
Type

optional

Version Information

requirements.txt:

| phitigra |

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 trac ticket #27330

4.1.226 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

Version Information

package-version.txt:

| 0.7.5 |

install-requires.txt:

| pickleshare >= 0.7.5 |
**External Packages, Release 9.6**

**Equivalent System Packages**

conda:

```bash
$ conda install pickleshare
```

macports: install the following packages: py-pickleshare

opensuse:

```bash
$ sudo zypper install python3-pickleshare
```

void:

```bash
$ sudo xbps-install python3-pickleshare
```

See [https://repology.org/project/pickleshare/versions](https://repology.org/project/pickleshare/versions), [https://repology.org/project/python:pickleshare/versions](https://repology.org/project/python:pickleshare/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 trac ticket #29023

### 4.1.227 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.

**License**

Standard PIL License

**Upstream Contact**

- Author: Alex Clark <aclark@aclark.net>
- [https://python-pillow.org/](https://python-pillow.org/)
- [Homepage: http://python-imaging.github.io/](http://python-imaging.github.io/)

**Dependencies**

- Python
**Type**

standard

**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 trac ticket #29023

**4.1.228 pint: Physical quantities module**

**Description**

Physical quantities module

**License**

BSD
Upstream Contact

https://pypi.org/project/Pint/

Type

optional

Version Information

package-version.txt:

0.17

install-requires.txt:

Pint

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 trac ticket #29023

4.1.229 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/
Dependencies

- python
- setuptools

Type

standard

Version Information

package-version.txt:

22.0.2

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

conda:

$ conda install pip

macports: install the following packages: py-pip

opensuse:

$ sudo zypper install python3-pip

void:

$ sudo xbps-install python3-pip


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

4.1.230 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

Dependencies

• C compiler + toolchain

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

Version Information

package-version.txt:

0.9.7.p2

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.

### 4.1.231 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

#### 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

```
$ sudo zypper install pkg-config
```

opensuse:

```
$ sudo zbps-install python3-pkgconfig
```

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 trac ticket #29023

4.1.232 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>

Dependencies

None
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

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

4.1. Details of external packages
External Packages, Release 9.6

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

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

4.1.233 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

Dependencies

  • None

Type

optional
Version Information

package-version.txt:

5.2

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 trac ticket #27330

4.1.234 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

Version Information

package-version.txt:

2.5.1

install-requires.txt:

platformdirs

4.1. Details of external packages
4.1.235 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

Version Information

package-version.txt:

1.0.0

install-requires.txt:

pluggy

Equivalent System Packages

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 trac ticket #29023
4.1.236  ply: Python Lex & Yacc

Description

Python Lex & Yacc

License

BSD

Upstream Contact

https://pypi.org/project/ply/

Type

standard

Version Information

package-version.txt:

3.11

install-requires.txt:

ply

Equivalent System Packages

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 trac ticket #29023

4.1.237  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

**Dependencies**

- GMP

**Type**

optional

**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 trac ticket #27330

**4.1.238 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;

It is strongly recommended to also install JuPyMake:

sage -i jupymake

When JuPyMake is present, Sage is able to use a more robust interface to Polymake.
Debugging polymake install problems

```bash
# apt-get install libdevel-trace-perl
$ cd src
$ perl -d:Trace support/configure.pl
```

**Type**

optional

**Version Information**

package-version.txt:

```
4.6
```

**Equivalent System Packages**

arch:

```
$ sudo pacman -S polymake
```

Debian/Ubuntu:

```
$ sudo apt-get install polymake libpolymake-dev
```

Fedora/Redhat/CentOS:

```
$ 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.
4.1.239 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

Dependencies

None

Type

standard

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 trac ticket #27330
4.1.240 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>

Dependencies

None

Type

optional

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 trac ticket #27330

4.1.241 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

**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

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:

$ 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.

4.1.242  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/videlec/pplpy

Type

standard
## Version Information

**package-version.txt:**

```
0.8.6
```

**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 trac ticket #29023

### 4.1.243 pplpy_doc: Python interface to the Parma Polyhedra Library (documentation)

**Description**

PPL Python wrapper (documentation)

**License**

GPL version 3

**Upstream Contact**

- https://github.com/videlec/pplpy

**Type**

standard
Version Information

package-version.txt:

0.8.6

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 trac ticket #27330

4.1.244 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

Version Information

package-version.txt:

7.1

Equivalent System Packages

arch:

$ sudo pacman -S primecount

conda:

$ conda install primecount

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

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.

4.1.245 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

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 trac ticket #29023

4.1.246 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

Version Information

package-version.txt:

7.6

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:

```bash
$ sudo yum install primesieve-devel primesieve
```

Homebrew:

```bash
$ brew install primesieve
```

Opensuse:

```bash
$ sudo zypper install primesieve
```

Void:

```bash
$ 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.

### 4.1.247 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

**Version Information**

package-version.txt:

```
0.12.0
```

install-requires.txt:

```
prometheus_client >=0.8.0
```

**Equivalent System Packages**

conda:

```bash
$ 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 trac ticket #29023

4.1.248 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

Version Information

package-version.txt:

3.0.22

install-requires.txt:

prompt_toolkit >=3.0.5

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
However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see trac ticket #29023
4.1.249 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

Upstream Contact

https://github.com/pexpect/ptyprocess

Dependencies

- Python

Type

standard

Version Information

package-version.txt:

0.5.1.p0

install-requires.txt:

ptyprocess ==0.5.1
# :trac: 31280 #comment:42 and following
# sagelib is not compatible with ptyprocess 0.5.2, 0.6, and 0.7

Equivalent System Packages

conda:

$ conda install ptyprocess

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 trac ticket #29023

4.1.250 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

Version Information

package-version.txt:

1.10.0

install-requires.txt:

py

Equivalent System Packages

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 trac ticket #29023
4.1.251 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

Version Information

package-version.txt:

2.8.1

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 trac ticket #29023
4.1.252 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

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 trac ticket #27330

4.1.253 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

Dependencies

None.

Special Update/Build Instructions

None.

Type

optional

Version Information

package-version.txt:

0.6.3

install-requires.txt:

pycosat >=0.6.3

Equivalent System Packages

conda:

$ conda install pycosat


However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see trac ticket #29023
4.1.254 pycparser: Parser of the C language in Python

Description

development website: https://github.com/eliben/pycparser
PyPI page: https://pypi.org/project/pycparser/

License

BSD

Upstream Contact

https://github.com/eliben/pycparser

Type

standard

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 trac ticket #29023
4.1.255 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

Version Information

package-version.txt:

5.6.8

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 trac ticket #29023
4.1.256 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

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 trac ticket #29023

4.1.257 pyflakes: Passive checker of Python programs

Description

passive checker of Python programs

License

MIT
Upstream Contact

https://pypi.org/project/pyflakes/

Type

optional

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 trac ticket #27330

4.1.258 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

Dependencies

Python

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

Version Information

package-version.txt:

```
2.10.0
```

`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 trac ticket #29023

4.1.259 pygraphviz: Python interface to Graphviz

Description

Python interface to Graphviz

License

BSD

Upstream Contact

https://pypi.org/project/pygraphviz/

Type

optional

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 trac ticket #29023
4.1.260 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

Dependencies

- pip
- normaliz

Special Update/Build Instructions

Type

optional

Version Information

package-version.txt:

2.14

install-requires.txt:

pynormaliz ==2.14

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 trac ticket #29023
4.1.261 pyparsing: A Python parsing module

**Description**

A Python Parsing Module

**License**

MIT License

**Upstream Contact**

- Author: Paul McGuire
- Home page: http://pyparsing.wikispaces.com

**Dependencies**

Python

**Type**

standard

**Version Information**

package-version.txt:

```
3.0.6
```

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/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 trac ticket #29023
4.1.262 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/

Type

optional

Version Information

requirements.txt:

pyppeteer

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 trac ticket #27330

4.1.263 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

Version Information

package-version.txt:

0.18.0

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 trac ticket #29023

4.1. Details of external packages
4.1.264  **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](https://github.com/sebasguts/SingularPython)

**Type**

optional

**Version Information**

package-version.txt:

```
0.9.7
```

install-requires.txt:

```
pysingular >=0.9.5
```

**Equivalent System Packages**

conda:

```
$ conda install pysingular
```

See [https://repology.org/project/pysingular/versions](https://repology.org/project/pysingular/versions), [https://repology.org/project/python:pysingular/versions](https://repology.org/project/python:pysingular/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 trac ticket #29023

4.1.265  **pytest: Simple powerful testing with Python**

**Description**

pytest: simple powerful testing with Python
License
MIT

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

Type
optional

Version Information
requirements.txt:
pytest

Equivalent System Packages
conda:
$ conda install pytest

macports: install the following packages: py-pytest
void:
$ 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 trac ticket #27330

4.1.266 python3: The Python programming language

Description
The Python programming language

Upstream Contact
https://www.python.org
Type

standard

Version Information

package-version.txt:

3.10.3

Equivalent System Packages

alpine: install the following packages: python3-dev
cygwin:

```bash
$ apt-cyg install python39-devel
```

Debian/Ubuntu:

```bash
$ sudo apt-get install python3 libpython3-dev python3-distutils
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install python3-devel
```

freebsd:

```bash
$ sudo pkg install lang/python
```

homebrew:

```bash
$ brew install python3
```

macports: install the following packages: python39

opensuse:

```bash
$ sudo zypper install python3-devel
```

void:

```bash
$ sudo xbps-install python3-devel
```

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

If the system package is installed, ./configure will check whether it can be used.
4.1.267 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/

Dependencies

- python
- igraph

Special Update/Build Instructions

Type

optional

Version Information

package-version.txt:

0.9.9

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 trac ticket #29023
4.1.268 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

Version Information

package-version.txt:

0.11.0

install-requires.txt:

pythran

Equivalent System Packages

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 trac ticket #29023

4.1.269 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

Version Information

package-version.txt:

2021.3

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

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 trac ticket #29023

4.1.270 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
External Packages, Release 9.6

Type

optional

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

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

4.1.271 pyzmq: Python bindings for the zeromq networking library

Description

Python bindings for the zeromq networking library.

License

LGPLv3+

Upstream Contact

http://www.zeromq.org

Dependencies

- Python
- Cython
- zeromq
Special Update/Build Instructions

None.

Type

standard

Version Information

package-version.txt:

22.3.0

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 trac ticket #29023

4.1.272 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

Dependencies

- readline
- saclib

Special Update/Build Instructions

One might need to set MAKE to “make -j1” for this to be built successfully.

Type

experimental

Version Information

package-version.txt:

B.1.72
Equivalent System Packages

See 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 trac ticket #27330

4.1.273 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 halfspace 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 (see also documentation at http://pythonhosted.org/pyhull/).

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.
External Packages, Release 9.6

Type

standard

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.

4.1.274 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

Dependencies

• GNU patch
• iconv
• Readline
• BLAS/LAPACK
• xz
• pcre
• curl
• https-capable SSL
Type

standard

Version Information

package-version.txt:
3.6.3

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.

4.1.275 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
optional

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 trac ticket #27330
4.1.276 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

Dependencies

- ncurses

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
Version Information

package-version.txt:

8.0

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
4.1.277 requests: An HTTP library for Python

Description
Python HTTP for Humans.

License
Apache 2.0

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

Type
standard

Version Information
package-version.txt:
2.26.0

install-requires.txt:
requests >=2.13.0

Equivalent System Packages
conda:
$ conda install requests

macports: install the following packages: py-requests
opensuse:
$ sudo zypper install python3-requests

void:
$ 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 trac ticket #29023
4.1.278 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

Version Information

requirements.txt:

retrolab ~= 0.3

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 trac ticket #27330

4.1.279 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

Dependencies

Special Update/Build Instructions

Patches

- setup.patch: takes care of a few parsing issues.
- cygwin.patch: let rpy2 build on Cygwin.

Type

standard

Version Information

package-version.txt:

3.3.6

install-requires.txt:

rpy2 >=3.3, <3.4

Equivalent System Packages

conda:

$ conda install rpy2

See https://repology.org/project/rpy2/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 trac ticket #29023

4.1.280 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

Dependencies

- notedown
- pandoc

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

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 trac ticket #29023
4.1.281 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

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:

```bash
$ 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 trac ticket #27330

### 4.1.282 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

**Version Information**

package-version.txt:

```plaintext
0.9
```

**Equivalent System Packages**

arch:

```bash
$ sudo pacman -S rankwidth
```

conda:

```bash
$ conda install rw
```

Debian/Ubuntu:

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

Fedora/Redhat/CentOS:

```bash
```
$ 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.

4.1.283 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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THE SOFTWARE IS PROVIDED “AS IS” AND THE AUTHOR DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

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
**Dependencies**

None.

**Type**

optional

**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 trac ticket #27330

4.1.284 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 sourceable 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 trac ticket #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`.

4.1. Details of external packages
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 trac ticket #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
Version Information

package-version.txt:

9.6

install-requires.txt:

sage-conf ~= 9.5.b6

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 trac ticket #29023

4.1.285 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

Version Information

package-version.txt:

9.6

install-requires.txt:

sage_docbuild
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 trac ticket #29023

4.1.286 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

Version Information

requirements.txt:

| sage-flatsurf |

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 trac ticket #27330

4.1.287 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

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 trac ticket #29023

4.1.288 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

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 trac ticket #29023

4.1.289 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

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 trac ticket #29023

4.1.290 sage-setup: Build system of the SageMath library

This is the build system of the Sage library, based on setuptools.

Type
standard

Version Information

package-version.txt:
9.6

install-requires.txt:
sage-setup ~= 9.5.b6

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 trac ticket #29023
4.1.291 sage_sws2rst: Translate legacy Sage worksheet files (.sws) to reStructuredText (.rst) files

Description

Provides a script `sage-sw2rst`, 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 SageMath to Python 3.

This package was extracted from the SageNB sources in trac ticket #28838 to provide a way to convert pedagogical material written available in Sage worksheet format.

Type

optional

Version Information

package-version.txt:

9.6

install-requires.txt:

sage_sws2rst

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 trac ticket #29023.

4.1.292 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) 2005-2020 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 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.

### Documentation

- Categories
- Structure
- Coercion
- Classes, Metaclasses

### Type

experimental

### Version Information

package-version.txt:

```
9.6
```

### 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 trac ticket #27330

#### 4.1.293 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
Version Information

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 trac ticket #27330

4.1.294 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

Version Information

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 trac ticket #27330

4.1.295 Sage: Open Source Mathematics Software: Sage objects, elements, parents, categories, coercion, metaclasses

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 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.

Documentation

- Categories
- Structure
- Coercion
- Classes, Metaclasses

Type

experimental

Version Information

package-version.txt:

```
9.6
```

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 trac ticket #27330

4.1.296 `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

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 trac ticket #29023

4.1.297 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.

The documentation of the SageTeX package is licensed under the Creative Commons Attribution-Share Alike 3.0 License. To view a copy of this license, visit http://creativecommons.org/licenses/by-sa/3.0/ or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA.

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 \texttt{spkg-check} script will exit without actually testing anything if it cannot find “latex” in your path.

Notes


The directory \texttt{$SAGE_ROOT/local/share/doc/sagetex} contains documentation and an example file. See \texttt{$SAGE_ROOT/local/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

Version Information

package-version.txt:

\begin{verbatim}
3.5
\end{verbatim}

install-requires.txt:

\begin{verbatim}
sagetex >=3.5
\end{verbatim}

Equivalent System Packages

conda:

\begin{verbatim}
$ conda install sagetex
\end{verbatim}

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 trac ticket \#29023
4.1.298 scipoptsuite: Mixed integer programming solver

Description

SCIP is currently one of the fastest non-commercial 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

ZIB Academic License

The ZIB Academic License allows the use of software distributed under this license without charge for research purposes as a member of a non-commercial and academic institution, e.g., a university. The software is available with its source code.

http://scip.zib.de/academic.txt

SPKG Maintainers

- Martin Albrecht (original spkg)
- Matthias Koeppe (updates for new spkg style)

Upstream Contact


Dependencies

cmake

Special Update/Build Instructions

We do not have permission to redistribute SCIP or SoPlex. Hence, you must download it yourself from http://scip.zib.de and put the tarball scipoptsuite-VERSION.tgz in $SAGE_ROOT/upstream, renaming it to scipoptsuite-VERSION-do-not-distribute.tgz.

Type

experimental
Version Information

package-version.txt:

```
5.0.1
```

Equivalent System Packages

See [https://repology.org/project/scipoptsuite/versions](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 [trac ticket #27330](https://trac.sagemath.org/ticket/27330)

4.1.299 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
External Packages, Release 9.6

Special Update/Build Instructions

- None.

Type

standard

Version Information

package-version.txt:

1.7.3

install-requires.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

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

However, these system packages will not be used for building Sage because using Python site-packages is not supported by the Sage distribution; see trac ticket #29023
4.1.300 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

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 trac ticket #29023
4.1.301 setuptools: Build system for Python packages

Description

setuptools is a collection of enhancements to the Python distutils (for Python 2.6 and up) that allow you to more easily build and distribute Python packages, especially ones that have dependencies on other packages.

Website: http://pypi.python.org/pypi/setuptools/

License

PSF or ZPL. i.e Python Software Foundation License or Zope Public License

Upstream Contact

• Phillip J. Eby (distutils-sig@python.org)

Dependencies

• python

Type

standard

Version Information

package-version.txt:

59.8.0

install-requires.txt:

setuptools >=49.6.0

Equivalent System Packages

conda:

$ conda install setuptools

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 trac ticket #29023

### 4.1.302 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

**Version Information**

package-version.txt:

```
6.3.2
```

install-requires.txt:

```
setuptools_scm >=4.1.2
```

**Equivalent System Packages**

conda:

```
$ conda install setuptools_scm
```

macports: install the following packages: py-setuptools_scm

opensuse:

```
$ sudo zypper install python3-setuptools_scm
```

void:

```
$ sudo xbps-install python3-setuptools_scm
```
See 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 trac ticket #29023

### 4.1.303 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/

**Type**

standard

**Version Information**

package-version.txt:

```text
1.1
```

install-requires.txt:

```text
setuptools-scm-git-archive
```

**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 trac ticket #29023

### 4.1.304 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.
Type

standard

Version Information

package-version.txt:

59.8.0

install-requires.txt:

# We use this file to mark the package as a Python package

Equivalent System Packages

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 trac ticket #29023

4.1.305 simplesimplegeneric: Simple single-dispatch generic functions for Python

Description

Simple generic functions (similar to Python’s own len(), pickle.dump(), etc.)

The simplesimplegeneric 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
Version Information

package-version.txt:

0.8.1.p0

install-requires.txt:

simplegeneric >=0.8.1

Equivalent System Packages

conda:

$ conda install simplegeneric

macports: install the following packages: py-simplegeneric

opensuse:

$ sudo zypper install python3-simplegeneric

void:

$ 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 trac ticket #29023

4.1.306  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
External Packages, Release 9.6

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.

Type

standard

Version Information

package-version.txt:

4.2.1p3

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

genoot:

4.1. Details of external packages
4.1.307 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

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 trac ticket #29023

4.1.308 sip: Python extension module generator for C and C++ libraries

Description

Python extension module generator for C and C++ libraries

Upstream contact

- https://www.riverbankcomputing.com/software/sip/
- https://pypi.python.org/pypi/SIP

License

SIP is released under the GPL v2, GPL v3 licenses, and under a license similar to the BSD license.

SIP is copyright (c) Riverbank Computing Limited. Its homepage is https://www.riverbankcomputing.com/software/sip/.

Type

optional

Version Information

package-version.txt:

4.18

Equivalent System Packages

conda:

$ conda install sip

homebrew:

$ brew install sip
macports: install the following packages: py-sip

```
$ sudo xbps-install python3-sip
```

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

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

4.1.309 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

**Version Information**

package-version.txt:

```
2.1.0
```
Equivalent System Packages

arch:

```
$ sudo pacman -S sirocco
```

opensuse:

```
$ sudo zypper install sirocco-devel
```

See 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 trac ticket #27330

4.1.310 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

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 trac ticket #29023

4.1.311 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
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 trac ticket #27330

4.1.312 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

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 :trac:`31180` snappy # cypari 2.4.0 has a broken sdist, :trac:`31180` cypari !=2.4.0 # An optional database (110M uncompressed) snappy_15_knots
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 trac ticket #27330

4.1.313 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

Version Information

package-version.txt:

```
2.1.0
```

install-requires.txt:

```
snowballstemmer >=1.2.1
```

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 trac ticket #29023

4.1.314 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

Version Information

package-version.txt:

2.3.1

install-requires.txt:

soupsieve

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 trac ticket #29023

4.1.315 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

Version Information

package-version.txt:

4.4.0

install-requires.txt:

sphinx >=4.3, <4.5

Equivalent System Packages

conda:

$ conda install sphinx

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 trac ticket #29023

4.1.316 sphinxcontrib_applehelp: Sphinx extension which outputs Apple help book

Description

Sphinx extension which outputs Apple help book

License

BSD

Type

standard

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 trac ticket #29023

4.1.317 sphinxcontrib_devhelp: Sphinx extension which outputs Devhelp documents

Description
Sphinx extension which outputs Devhelp documents

License
BSD

Type
standard

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 trac ticket #29023
4.1.318 sphinxcontrib_htmlhelp: Sphinx extension which outputs HTML help book

Description

Sphinx extension which outputs HTML help book

License

BSD

Type

standard

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 trac ticket #29023

4.1.319 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

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 trac ticket #29023

4.1.320 sphinxcontrib_qthelp: Sphinx extension which outputs QtHelp documents

Description

Sphinx extension which outputs QtHelp documents

License

BSD
**Type**

standard

**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](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 trac ticket #29023

**4.1.321 sphinxcontrib_serializinghtml: Sphinx extension which outputs serialized HTML files**

**Description**

Sphinx extension which outputs serialized HTML files

**License**

BSD
External Packages, Release 9.6

Type

standard

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 trac ticket #29023

4.1.322 sphinxcontrib_websupport: Sphinx API for Web apps

Description

sphinxcontrib-websupport provides a Python API to easily integrate Sphinx documentation into your Web application.

License

BSD
**Type**

standard

**Version Information**

package-version.txt:

1.2.1

install-requires.txt:

sphinxcontrib_websupport >=1.2.1

**Equivalent System Packages**

conda:

$ conda install sphinxcontrib-websupport

macports: install the following packages: py-sphinxcontrib-websupport

opensuse:

$ sudo zypper install python3-sphinxcontrib-websupport

See https://repology.org/project/python:sphinxcontrib-websupport/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 trac ticket #29023

4.1.323 sqlalchemy: A database abstraction library

**Description**

Database Abstraction Library

**License**

MIT

**Upstream Contact**

https://pypi.org/project/SQLAlchemy/
**Type**

optional

**Version Information**

requirements.txt:

```
sqlalchemy
```

**Equivalent System Packages**

conda:

```
$ conda install sqlalchemy
```

macports: install the following packages: py-sqlalchemy

```
$ 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 trac ticket #27330

**4.1.324 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
External Packages, Release 9.6

Dependencies

- readline

Special Update/Build Instructions

- Use the autoconf version of sqlite.

Type

standard

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

4.1. Details of external packages
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](https://repology.org/project/sqlite/versions)

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

### 4.1.325 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](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.

License: because SuiteSparse is a collection, it comes with a variety of licenses. Find below a copy of the “LICENSES.txt” shipped with SuiteSparse.
4.1. Details of external packages

**AMD/Doc/License.txt**

AMD, Copyright (c), 1996-2015, Timothy A. Davis, Patrick R. Amestoy, and Iain S. Duff. All Rights Reserved.

Availability:

http://www.suitesparse.com

AMD License: BSD 3-clause:

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Mongoose License

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Type

standard
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:

$ sudo emerge sci-libs/amd sci-libs/cholmod sci-libs/suitesparseconfig sci-libs/umfpack

homebrew:

$ brew install suite-sparse

macports: install the following packages: SuiteSparse

opensuse:

$ sudo zypper install suitesparse-devel

void:

$ sudo xbps-install SuiteSparse-devel

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

If the system package is installed, ./configure will check whether it can be used.
4.1.326 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

Version Information

package-version.txt:

1.0.6-gcc6
Equivalent System Packages

opensuse:

$ sudo zypper install surf

See 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 trac ticket #27330

4.1.327  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://pypi.org/project/surface-dynamics/

Type

optional

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 trac ticket #27330
4.1.328 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

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 trac ticket #27330
4.1.329 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
optional

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 trac ticket #29023

4.1.330 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.algorithm.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

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.

### 4.1.331 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:

```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 trac ticket (#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 http://trac.sagemath.org/sage_trac/ticket/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

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:
External Packages, Release 9.6

$ 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.

### 4.1.332 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

Version Information

package-version.txt:

1.10.1

install-requires.txt:

sympy >=1.6, <2.0

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

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

4.1.333 tachyon: A ray tracing system

Description

Tachyon is a raytracer 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.

License

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Upstream Contact

- http://jedi.ks.uiuc.edu/~johns/raytracer/
- http://www.photonlimited.com/~johns/raytracer/
- John Stone <johns@ks.uiuc.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

Version Information

package-version.txt:

0.98.9.p7
Equivalent System Packages

arch:

$ sudo pacman -S tachyon

conda:

$ conda install tachyon

Debian/Ubuntu:

$ sudo apt-get install tachyon

Fedora/Redhat/CentOS:

$ sudo yum install tachyon tachyon-devel

freebsd:

$ sudo pkg install graphics/tachyon

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.

4.1.334 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

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 trac ticket #27330

4.1.335 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

Version Information

package-version.txt:
0.12.1

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 trac ticket #29023

4.1.336 testpath: Testing utilities for filesystem-related code

Description

Testpath is a collection of utilities for testing code which uses and manipulates the filesystem and system commands

Type

standard

Version Information

package-version.txt:
0.5.0

install-requires.txt:
testpath >=0.4.4

4.1. Details of external packages
Equivalent System Packages

conda:

```
$ conda install testpath
```

macports: install the following packages: py-testpath
void:

```
$ sudo xbps-install python3-testpath
```

See https://repology.org/project/testpath/versions, https://repology.org/project/python:testpath/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 trac ticket #29023

4.1.337 texlive: A comprehensive TeX system

Description

TeXLive 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

**Version Information**

**Equivalent System Packages**

alpine: install the following packages: texlive

arch:

```bash
$ sudo pacman -S texlive-core texlive-latexextra texlive-langjapanese texlive-
-langcyrillic
```

cygwin:

```bash
$ apt-cyg install texlive
```

Debian/Ubuntu:

```bash
$ sudo apt-get install texlive-latex-extra texlive-xetex latexmk dvipng tex-gyre␣
→texlive-fonts-recommended texlive-lang-cyrillic texlive-lang-english texlive-lang-
→langcjk texlive-lang-european texlive-lang-german texlive-lang-italian texlive-lang-
→langjapanese texlive-lang-polish texlive-lang-portuguese texlive-lang-spanish
```

Fedora/Redhat/CentOS:

```bash
$ sudo yum install latexmk texlive texlive-collection-latexextra texlive-collection-
→langcjk texlive-lang-cyrillic texlive-lang-european texlive-lang-german texlive-lang-
→italian texlive-lang-japanese texlive-lang-polish texlive-lang-portuguese texlive-lang-
→spanish
```

genoot:

```bash
$ sudo emerge dev-tex/latexmk app-text/texlive app-text/dvipng dev-texlive/texlive-
→langcjk dev-texlive/texlive-langcyrillic dev-texlive/texlive-langenglish dev-texlive/
→texlive-langcjk dev-texlive/texlive-langcyrillic dev-texlive/texlive-langenglish dev-
→texlive/langcjk dev-texlive/langcyrillic dev-texlive/langenglish dev-texlive/
→langcjk dev-texlive/langcyrillic dev-texlive/langenglish dev-texlive/langcjk dev-
→texlive/langcyrillic dev-texlive/langenglish dev-texlive/langcjk dev-texlive/
→langcyrillic dev-texlive/langenglish dev-texlive/langcjk dev-texlive/langcyrillic dev-
→texlive/langenglish dev-texlive/langcjk dev-texlive/langcyrillic dev-texlive/
→langenglish dev-texlive/langcjk dev-texlive/langcyrillic dev-texlive/langenglish
```

macports: install the following packages: texlive

opensuse:

```bash
$ sudo zypper install texlive
```

slackware:

```bash
$ sudo slackpkg install texlive
```

void:

```bash

```
$ 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.

4.1.338 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

Version Information
package-version.txt:

1.6.3

install-requires.txt:

texttable >=1.6.3
Equivalent System Packages

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 trac ticket #29023

4.1.339 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

Version Information

package-version.txt:

```
r122.p0
```
**Equivalent System Packages**

conda:

```bash
$ conda install three.js
```

See [https://repology.org/project/threejs/versions](https://repology.org/project/threejs/versions), [https://repology.org/project/threejs-sage/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 [trac ticket #27330](https://trac.sagemath.org/ticket/27330)

### 4.1.340 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
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 trac ticket #27330

4.1.341 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

Version Information

package-version.txt:

0.10.2

install-requires.txt:

toml
Equivalent System Packages

void:

```
$ sudo xbps-install python3-toml
```

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

### 4.1.342 tomli: A lil’ TOML parser

**Description**

A lil’ TOML parser

**License**

**Upstream Contact**

https://pypi.org/project/tomli/

**Type**

standard

**Version Information**

package-version.txt:

```
1.2.1
```

install-requires.txt:

```
tomli
```

Equivalent System Packages

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 trac ticket #29023
4.1.343 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)
Universität Bayreuth
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
Version Information

package-version.txt:

0.17.7

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 trac ticket #27330

4.1.344 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

Version Information

package-version.txt:

6.1

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 trac ticket #29023

4.1.345 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

Version Information

package-version.txt:

3.24.3

install-requires.txt:

tox
Equivalent System Packages

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.

4.1.346 traitlets: Traitlets Python configuration system

Description

Traitlets Python configuration system
License

BSD

Upstream Contact

https://pypi.org/project/traitlets/

Type

standard

Version Information

package-version.txt:

5.1.1

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 trac ticket #29023
4.1.347 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

Version Information

package-version.txt:

3.10.0.0

install-requires.txt:

typing-extensions

Equivalent System Packages

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 trac ticket #29023

4.1.348 tzlocal: Python timezone information for the local timezone

Description

tzinfo object for the local timezone
Type

standard

Version Information

package-version.txt:
2.1

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 trac ticket #29023

4.1.349 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

Version Information

package-version.txt:

1.26.6

install-requires.txt:

urllib3

Equivalent System Packages

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 trac ticket #29023

4.1.350 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

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](https://repology.org/project/valgrind/versions)

However, these system packages will not be used for building Sage because `spkg-config.m4` has not been written for this package; see [trac ticket #27330](https://trac.sagemath.org/ticket/27330)

### 4.1.351 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/](https://pypi.python.org/pypi/vcversioner/)

**Dependencies**

Python, Setuptools

**Type**

standard

**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 trac ticket #29023

### 4.1.352 virtualenv: Virtual Python Environment builder

**Description**

Virtual Python Environment builder

**License**

MIT

**Upstream Contact**

https://pypi.org/project/virtualenv/

**Type**

standard

**Version Information**

package-version.txt:

```
20.14.1
```

install-requires.txt:

```
virtualenv
```

**Equivalent System Packages**

void:

```
$ sudo xbps-install python3-virtualenv
```

If the system package is installed, ./configure will check whether it can be used.
4.1.353 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

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 trac ticket #29023
4.1.354 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

Version Information
package-version.txt:
0.5.1

install-require.txt:
webencodings >=0.5.1

Equivalent System Packages
conda:
$ conda install webencodings

macports: install the following packages: py-webencodings
openssl:
$ 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 trac ticket #29023

4.1. Details of external packages
4.1.355 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

Version Information
package-version.txt:
0.37.0

install-requires.txt:
# :trac:`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 trac ticket #29023
4.1.356 widgetsnbextension: Jupyter notebook extension for interactive HTML widgets

Description
Interactive HTML widgets for Jupyter notebooks.

Type
standard

Version Information
package-version.txt:
3.5.2

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

4.1. Details of external packages
External Packages, Release 9.6


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

4.1.357 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:

$ sudo zypper install xz

slackware:

$ sudo slackpkg install xz

void:

$ sudo xbps-install xz

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

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

4.1.358 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, though we currently use the 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

Version Information

package-version.txt:

4.3.4

Equivalent System Packages

conda:

$ conda install zeromq

cygwin:

$ apt-cyg install libzmq-devel

Debian/Ubuntu:

$ sudo apt-get install libzmq3-dev

Fedora/Redhat/CentOS:

$ sudo yum install zmq zmq-devel

tfreebsd:

$ sudo pkg install net/libzmq4

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/zmq/versions

If the system package is installed, ./configure will check whether it can be used.
4.1.359 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

Version Information

package-version.txt:

3.5.0

install-requires.txt:

zipp >=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 trac ticket #29023
4.1.360 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/

Dependencies
- None

Special Update/Build Instructions

Patches
- cygwin_symbols.patch: remove undefined symbols on Cygwin.

Type
standard

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:

```bash
$ sudo yum install zlib-devel
```

domestic:

```bash
$ brew install zlib
```

macports: install the following packages: zlib

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

slackware:

```bash
$ sudo slackpkg install zlib
```

void:

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

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

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

### 4.1.361 zn_poly: C library for polynomial arithmetic in Z/nZ[x]

**Description**

zn_poly is a C library for polynomial arithmetic in Z/nZ[x], where n is any modulus that fits into an unsigned long.

Website: [https://gitlab.com/sagemath/zn_poly](https://gitlab.com/sagemath/zn_poly)

Note: Original website is at [https://web.maths.unsw.edu.au/~davidharvey/code/zn_poly/](https://web.maths.unsw.edu.au/~davidharvey/code/zn_poly) but is no longer maintained.

Sage maintains an “official” continuation of the project at the above link.

**License**

GPL V2 or V3. Some of the code has been copied from other projects - see the file src/COPYING for details.

**Upstream Contact**

- David Harvey
- E. M. Bray <erik.m.bray@gmail.com>
External Packages, Release 9.6

Dependencies

- GMP/MPIR
- (some) Python (to create the Makefile)
- GNU patch
- NTL apparently only if we configured zn_poly differently (same for FLINT)

Special Update/Build Instructions

- Make sure the patches still apply.
  Especially changes in `makemakefile.py` may also require changes to `spkg-install` (and perhaps also `spkg-check`).
- There’s also a `--use-flint` option to `configure`; no idea what it does, and we currently don’t use it either.
- TODO:
  - Use `make install` instead of manually “installing” (copying and symlinking) the [shared] libraries and header files. This requires further tweaking of `makemakefile.py`, since it currently only installs a static library and the headers.
  - If everything’s fine, i.e., no problems arise, some comments and especially some code I currently just commented out can certainly be removed. (-leif, 04/2012)
  - The version number “0.9.p11” is used as a doctest in the function `package_versions` in `sage/misc/packages.py`, so if this package gets upgraded, that doctest needs to be changed.

Patches

- All patches from Sage have been merged into upstream. These include:
  - `makemakefile.py`.patch:
    Improves the Python script creating the Makefile for better use at least within Sage; see patch for details. (Last modified at #12433, which added and changed a lot.)
  - `profiler.c`.patch, `zn_poly.h`.patch:
    Fix potential redefinition of `ulong` (in combination with other headers).
  - `mpn_mulmid-tune.c`.patch, `mulmid-tune.c`.patch, `mul-tune.c`.patch:
    Fix “jump into scope of identifier with variably modified type” errors. (See #8771).
  - `mpn_mulmid-test.c`.patch:
    Fix a potential problem when the value of `ZNP_mpn_smp_kara_thresh` is `SIZE_MAX`, this is usually unrealistic but can happen at least on linux on power7 with gcc-4.7.1 (see #14098).
  - `fix_fudge_factor_in_nuss-test.c`.patch:
    As the name says; fix provided by upstream (David Harvey); see #13947.
Type
standard

Version Information

package-version.txt:

0.9.2

Equivalent System Packages

arch:

$ sudo pacman -S zn_poly

conda:

$ conda install zn_poly

Debian/Ubuntu:

$ sudo apt-get install libzn-poly-dev

Fedora/Redhat/CentOS:

$ sudo yum install zn_poly zn_poly-devel

freebsd:

$ sudo pkg install math/zn_poly

nix:

$ nix-env --install zn_poly

opensuse:

$ sudo zypper install zn_poly-devel

void:

$ sudo xbps-install zn_poly


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