Sage: Open Source Mathematical Software

http://www.sagemath.org

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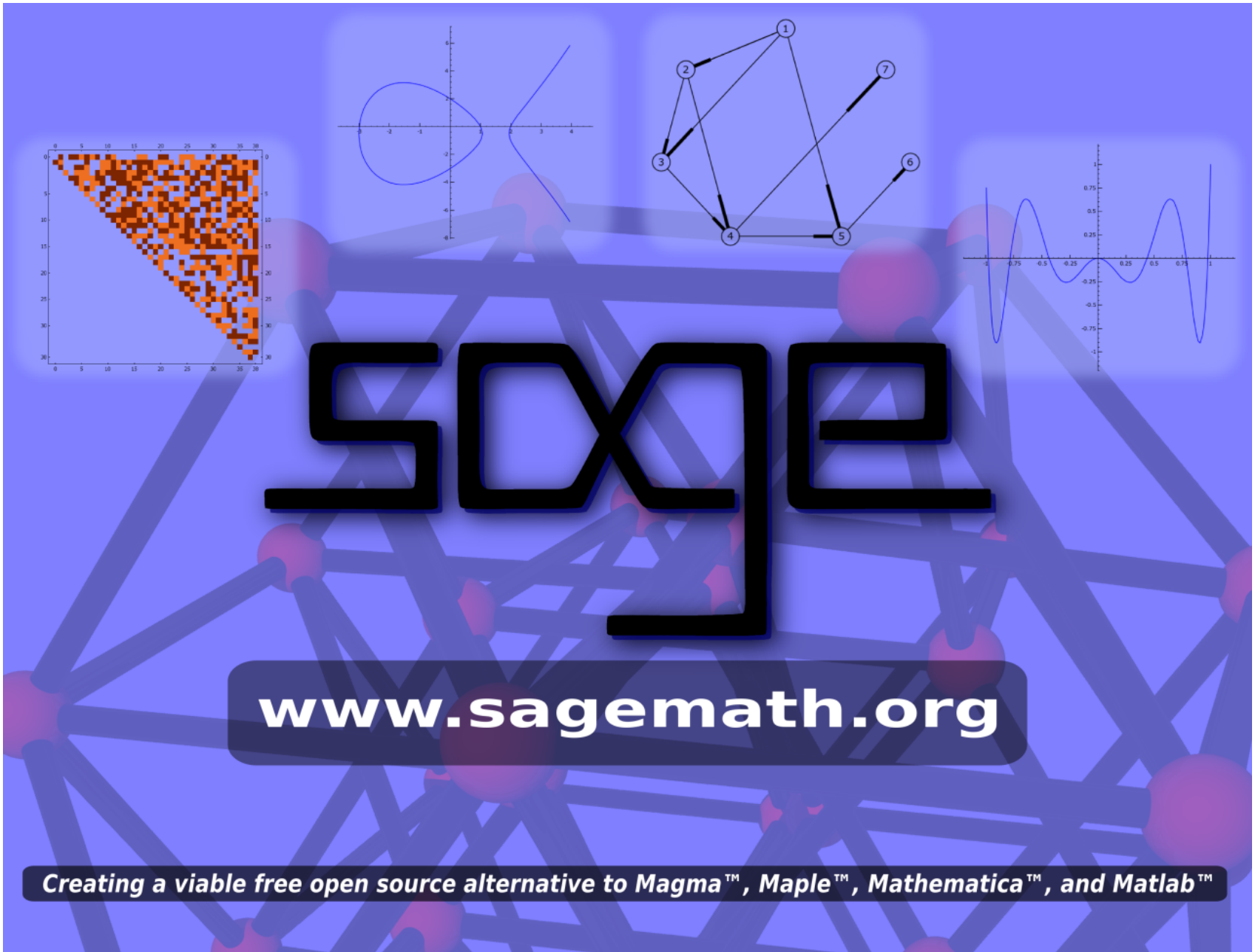
Sage: Creating a viable free open source alternative to Magma, Maple, Mathematica, and Matlab



History: I started the Sage project...

1997–1999	(**Berkeley**) **HECKE** – C++ (modular forms)
1999–2004	(**Berkeley**, **Harvard**) I wrote over 25,000 lines of **Magma** code.
Feb 2005	I released **SAGE-0.1** (almost 5 years ago)
Feb 2006	**UCSD SAGE Days 1** workshop – SAGE 1.0. ...
May 2007	Sage NSF grant: funds Clement Pernet. [...]
October 2007	**Clay Math Institute SAGE Days 5** workshop.
Nov. 2007	Sage wins Tropheés du Libre
Nov. 2007	**Heilbronn Institute SAGE Days 6**
Feb,Mar 2008	**IPAM Sage Days 7**; **Austin Sage Days 8**
	...
Dec 2009	**Sage Days 18** on BSD at Clay Math Institute.
January 2010	**Sage Days 19** (bug days): starts Saturday.

See `http://wstein.org/mathsoftbio/` for way more background details.

Motivation

- I must be able to **see inside and be able to change anything** in my math software in order to do first rate computational number theory research.
- Open Source: analogous **understanding the proofs** of theorems you use in your research, instead of just taking them all as black boxes.
- Also, I **care about graduate students** and forcing them to use expensive closed software to do research with me is mean.

Nov 2007: Sage wins first place in Tropheés du Libre and gets slashdotted...

Science: Open Source 'Sage' Takes Aim at High End Math Software

Posted by CmdrTaco on Saturday December 08, @09:15AM
from the **that'll-take-awhile** dept.

coondoggie writes

> "A new open source mathematics program is looking to push aside commercial software commonly used in mathematics education, in large government laboratories and in math-intensive research. The program's backers say the software, called Sage, can do anything from mapping a 12-dimensional object to calculating rainfall patterns under global warming."

octave, sage, it, software, maxima *(tagging beta)*

Read More... | science.slashdot.org 259 of 333 comments

Tons of articles all over resulted, about 10,000 downloads in a weekend, etc...

Mission Statement

Provide a uniform open source high-quality **viable alternative** to **Magma, Mathematica, Maple** and **MATLAB**.

When possible, do not reinvent the wheel but **reuse existing building blocks**. Make code that is:

- rigorously tested,
- easy to modify,
- very well documented, and
- peer reviewed.

Also create a **helpful environment** and community (mailing lists, irc-channel, workshops, coding sprints). There are 1588 subscribers to `sage-support`, 1118 subscribers to `sage-devel` and about 3000 messages a month.

What is Sage?

Sage is a very large mathematics software package developed by a worldwide community of over 200 developers. Sage is:

1. a **huge new library**, filling in gaps in functionality so Sage covers a wide range of algebraic, scientific, and statistical computing.

2. a **distribution** of the best free, open-source mathematics software available (Sage ships nearly 100 packages) that is easy to compile or install from binaries.

3. **interfaces** to almost all existing mathematics software packages (including Magma, PARI, GAP, Matlab, Mathematica, Maple, etc.)

Who Funds and Supports Sage Development?

Python Binds all things in Sage Together

Python is a modern mainstream programming language.

- "Python is fast enough for our site and allows us to **produce maintainable features in record times**, with a minimum of developers," said Cuong Do, Software Architect, **YouTube.com.**
- "Google has made no secret of the fact they use Python a lot for a number of internal projects. Even knowing that, once **I was an employee, I was amazed at how much Python code there actually is in the Google source code system**.", said Guido van Rossum, **Google**, creator of Python.
- "Python plays a key role in our production pipeline. Without it a project the size of **Star Wars: Episode II** would have been very difficult to pull off. From crowd rendering to batch processing to compositing, **Python binds all things together**," said Tommy Burnette, Senior Technical Director, **Industrial Light & Magic.**

Python & Cython: The Languages of the Sage Project

http://www.python.org and http://www.cython.org

Python

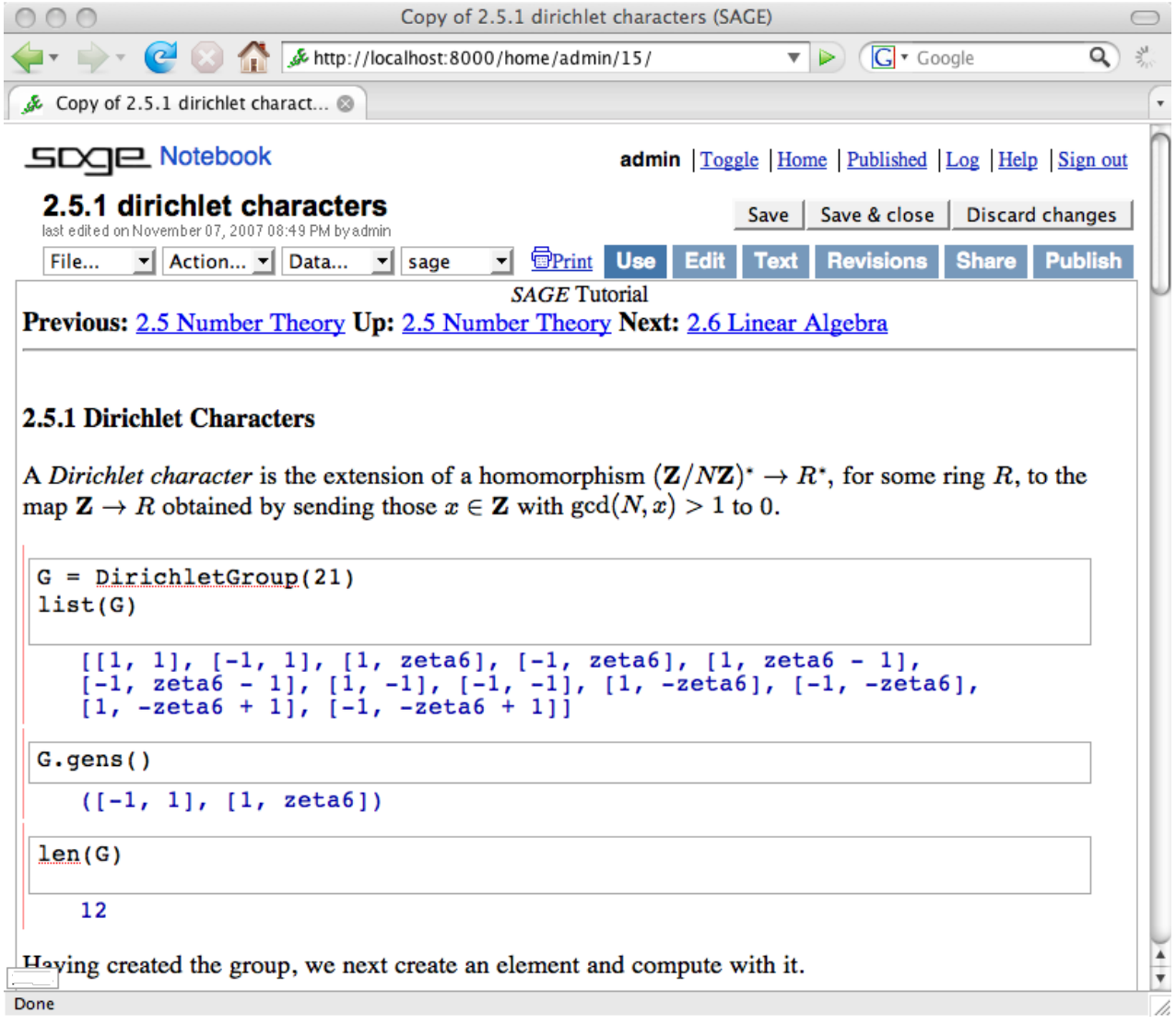
- A mainstream language with millions of users.

Cython: compiled Python, tightly integrated with Sage:

- Growing and getting used in other projects...
- Cython is a "killer feature": *Maple, Mathematica, and Magma have nothing like this*

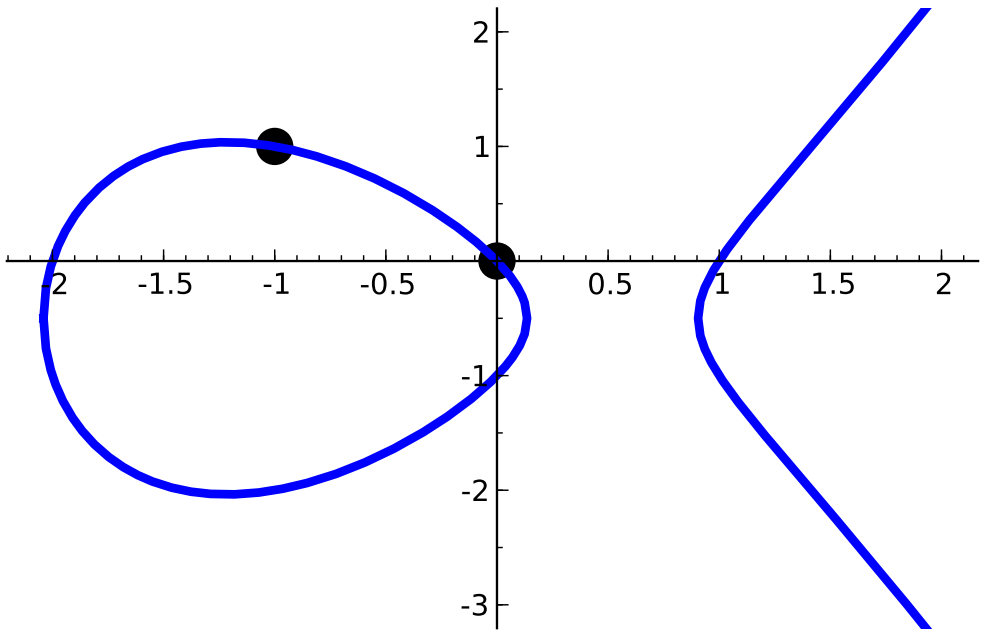
A Powerful Web-based Graphical User Interface

public notebooks available at `http://www.sagenb.org`



- graphical user interface
- plotting
- LaTeX typesetting
- remote access
- worksheet sharing
- interface to 3rd party systems, e.g. Magma

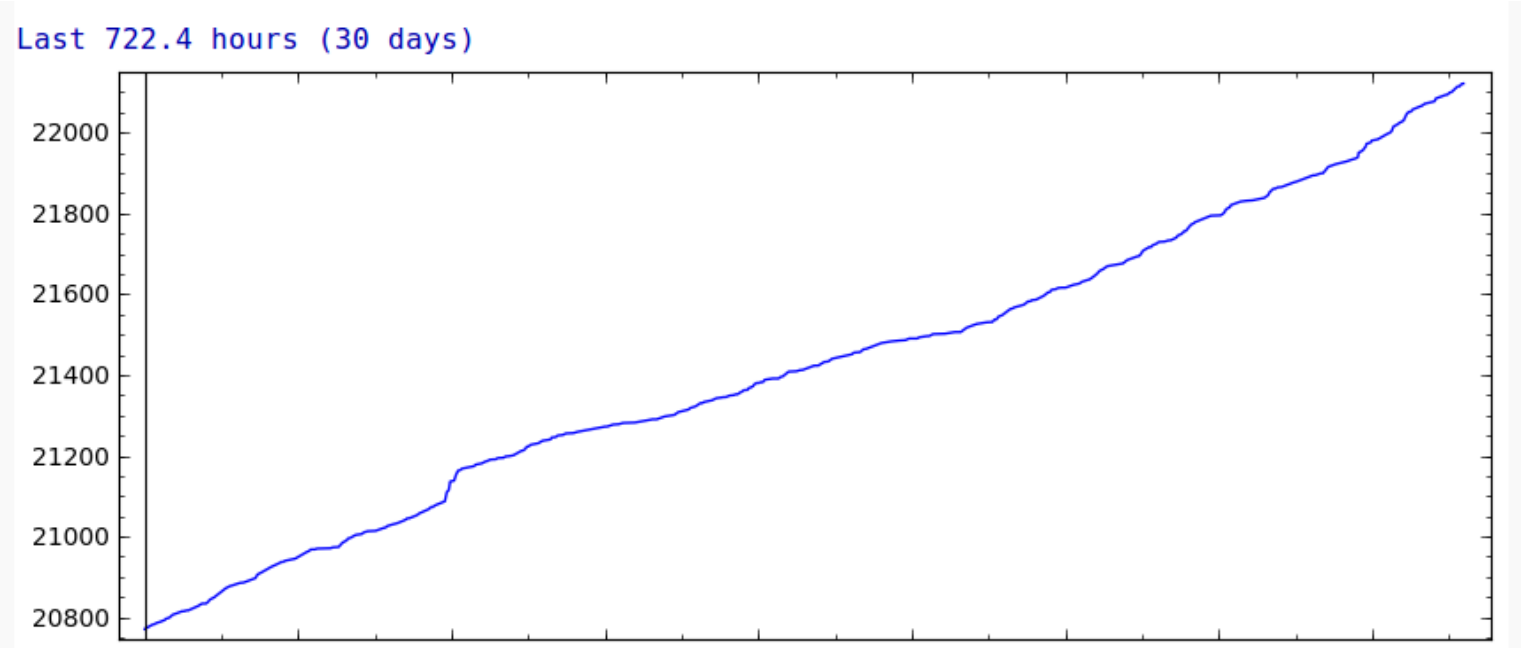
Demo



Getting Started With Sage

Web page: `http://www.sagemath.org`

1. Install Sage on your computer, or
2. Fully use Sage online at `http://www.sagenb.org`
3. Books, papers, and thousands of pages of documentation
4. Helpful mailing lists



Number of `http://sagenb.org` accounts during the last month