

A short introduction to SageMath

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The mission

Create a viable free open source alternative to Magma, Maple, Mathematica and Matlab.

Some advantages of SageMath

SageMath is free (GPL v2)

Freedom means

- 1 everybody can use it, by downloading the software from <http://sagemath.org>
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SageMath is based on Python

- no need to learn any specific syntax to use it
- easy access for students
- Python is a very powerful *object oriented language*, with a neat syntax

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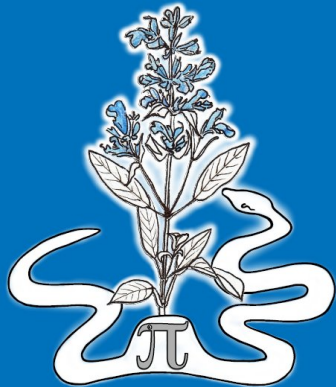
SageMath is developing and spreading fast

...sustained by an enthusiastic community of developers

Calcul mathématique avec



SAGE



by A. Casamayou, N. Cohen, G. Connan,
T. Dumont, L. Fousse, F. Maltey, M. Meulien,
M. Mezzarobba, C. Pernet, N.M. Thiéry &
P. Zimmermann (2013)

Released under *Creative Commons* license:

- freely downloadable from
<http://sagebook.gforge.inria.fr/>
- printed copies can be ordered at moderate price (10 €)

Object-oriented notation in Python

As an **object-oriented language**, Python (and hence SageMath) makes use of the following **postfix notation** (same in C++, Java, etc.):

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result = object.function(arguments)
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In a **procedural language**, this would be written as

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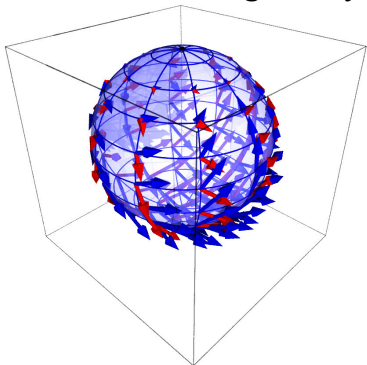
Examples

1. `riem = g.riemann()`
2. `lie_t_v = t.lie_der(v)`

NB: no argument in example 1

Un projet SageMath à l'Observatoire: SageManifolds

SageManifolds: extends the modern computer algebra system SageMath towards **differential geometry** and **tensor calculus**



Stereographic-coordinates frame on \mathbb{S}^2

- <http://sagemanifolds.obspm.fr/>
- free software (GPL), as SageMath
- ~ 65,000 lines of Python code (including comments and doctests)
- submitted to SageMath community as a sequence of 14 tickets
 - first ticket accepted in March 2015, the 14th one in Nov. 2016
- 5 developers, 3 reviewers

SageManifolds 1.0.1 released on 25 March 2017 and fully incl. in SageMath 7.6