Examples of embedding Sage output in LaTeX documents

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1 Overview

1. Get ahold of the files `sagetex.sty` and `sagetex.py`. They can be found in the Sage directory (`$SAGEROOT/examples/latex_embed/`), or on the CTAN website (`http://www.ctan.org`). Put these files in the same directory as your .tex file.

2. In your .tex file, add the following line to the preamble:

   ```
   \usepackage{sagetex}
   ```

3. Add some Sage code to your article (see below for examples).

4. Compile:

   - `latex filename.tex` (or use pdflatex)
   - `sage filename.sage`
   - `pdflatex filename.tex`

   Note that once you've run Sage, you don't need to run it again unless you've changed the Sage code in your article.

2 \sage

Use the command `\sage` to include the output of Sage commands inline. For example, the following line

```
The second derivative of $\sage{x*sin(x^2)}$
is $\sage{diff(x*sin(x^2),x,2)}$.
```

Will typeset the following:

The second derivative of $x \sin\left(x^2\right)$ is $6x \cos\left(x^2\right) - 4x^3 \sin\left(x^2\right)$.

3 \sageblock

The `sageblock` environment allows you to display *and* execute some Sage code.

```
var('a,b,c')
eqn = a*x^2 + b*x + c
s = solve(eqn, x)
```

The variables `eqn` and `s` are available throughout the document now. For example:

```
Solutions of $\mbox{eqn}=\sage{eqn}$:
\begin{displaymath}
\sage{s[0]}, \sage{s[1]}
\end{displaymath}
```

outputs:

Solutions of eqn $= ax^2 + bx + c$:

$$x = \frac{-\left(\sqrt{b^2 - 4ac}\right) - b}{2a}, x = \frac{\sqrt{b^2 - 4ac} - b}{2a}$$

Note that you can do anything in a code block that you can do in Sage and/or Python.

4 \sagesilent

The `sagesilent` environment executes some Sage code, but does not display the code. For example,

```
The following code block doesn't appear in the typeset file\dots
\begin{sagesilent}
  var('x')
  f = log(sin(x)/x)
\end{sagesilent}
but we can refer to whatever we did in that code block:
The Taylor Series of $f(x)=\sage{f}$ is: $\sage{ f.taylor(x, 0, 10) }$.
```

typesets the following.

The following code block doesn't appear in the typeset file... but we can refer to whatever we did in that code block: The Taylor Series of $f(x) = \log\left(\frac{\sin(x)}{x}\right)$ is: $\frac{-x^2}{6} - \frac{x^4}{180} - \frac{x^6}{2835} - \frac{x^8}{37800} - \frac{x^{10}}{467775}$.

5 \sageplot

To plot images, use the `sageplot` command. The following LaTeX code will include the image below.

```
\sageplot{graphs.FlowerSnark().plot()}
```