

# BRIEF ARTICLE

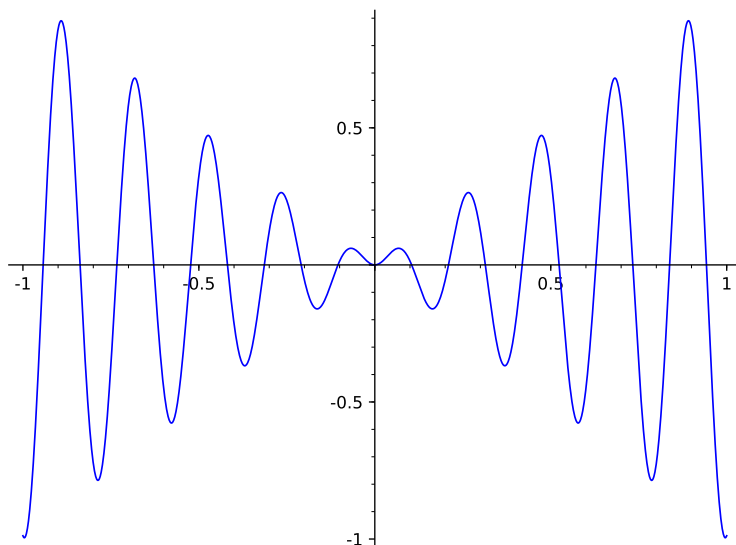
THE AUTHOR

## 1. INTRODUCTION

This is an example of using Sage within a T<sub>E</sub>X document. We can compute extended values like

$$32^{31} = 45671926166590716193865151022383844364247891968$$

We can plot functions like  $x \sin x$ :



We can integrate:

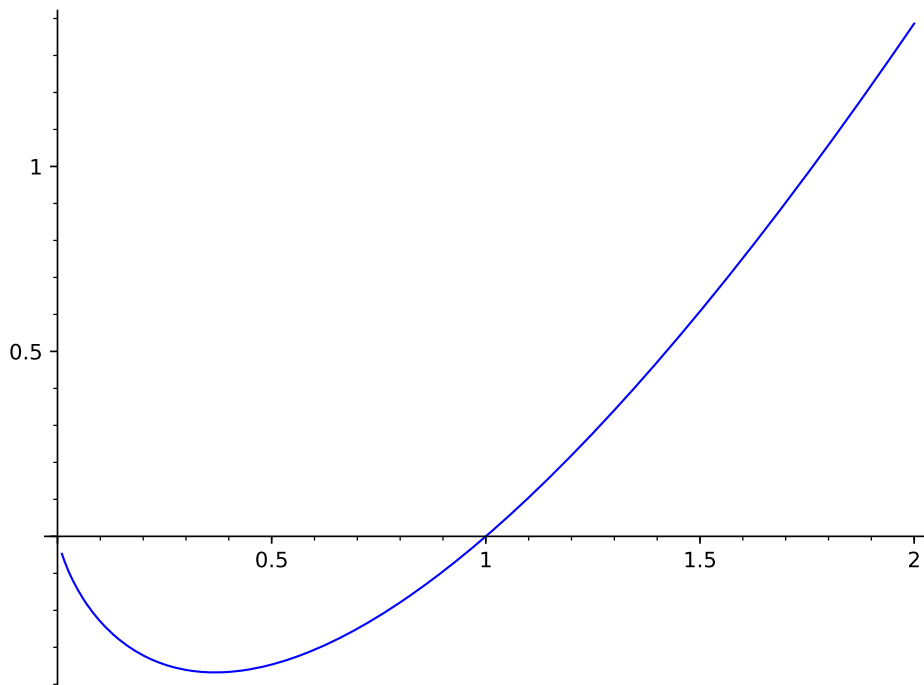
$$\int \frac{x^2 + x + 1}{(x-1)^3(x^2 + x + 2)} dx \\ = -\frac{9}{448} \sqrt{7} \arctan \left( \frac{1}{7} \sqrt{7} (2x+1) \right) - \frac{3(x+1)}{16(x^2 - 2x + 1)} + \frac{5}{128} \log(x^2 + x + 2) - \frac{5}{64} \log(x-1)$$

We can perform matrix calculations:

$$\begin{pmatrix} 468 & 576 & 684 \\ 1062 & 1305 & 1548 \\ 1656 & 2034 & 2412 \end{pmatrix}$$

$$AB = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 5 & 6 \\ 6 & 8 \end{pmatrix} = \begin{pmatrix} 17 & 22 \\ 39 & 50 \end{pmatrix}$$

Plots are fun; here is a second one showing  $x \ln x$ . The “width” command in the source is sent to the include graphics command in LaTeX rather than to Sage.



Sage understands mathematical constants and writes them symbolically unless it is told to produce a numerical approximation. The term  $e\pi$  below is not in the LaTeX source; instead it is the result of a Sage calculation, as is the numerical value on the other side of the equal sign.

The product of  $e$  and  $\pi$  is  $\pi e = 8.53973422267357$ .