

α -T_EX

L^AT_EX Meets Wolfram

α -T_EX is a L^AT_EX package which incorporates the typesetting ease and control of L^AT_EX with the power of the Wolfram Language. The goal of α -T_EX is to provide the most complete, powerful and self-sufficient typesetting environment.

```
\usepackage{alphatex}
```

Calculations

α -T_EX allows for inline calculations, making scientific or mathematical document typesetting simpler and more streamlined. The examples below show that α -T_EX has the full capabilities of the Wolfram Language, and thus knows mathematical constants, can solve integrals and can differentiate symbolically.

A basic example:

```
$3+4=\calc{3+4}$
```

Typed in L^AT_EX Calculated by the Wolfram Cloud

$$\overbrace{3+4} = \overbrace{7}$$

Some more advanced examples:

```
$3\mathrm{times}4\sin\left(\frac{\pi}{4}\right)=\calc{3*4 \sin[\pi/4]}$
```

$$3 \times 4 \sin\left(\frac{\pi}{4}\right) = 6\sqrt{2}$$

```
$\int_{10}^{35} e^x dx=\calc{Integrate [Exp[x], {x,10,35}]/N}$
```

$$\int_{10}^{35} e^x dx = 1.58601 \times 10^{15}$$

```
$\frac{d}{dx}x^2\log(x)=\calc{D[x^2 \log[x], x]}$
```

$$\frac{d}{dx}x^2 \log(x) = x + 2x \log(x)$$

Graphics

the `\graphic` command generates a graphic and saves it to your directory to be used later in your L^AT_EX document.

```

\graphic{Plot[ Tan[x], {x, 0, 2*Pi}]}{tan}

\begin{figure}[h!]
\centering
\includegraphics[width=0.6\textwidth]{tan.png}
\caption{Plot of  $\tan(x)$  generated with the Wolfram API}
\end{figure}

```

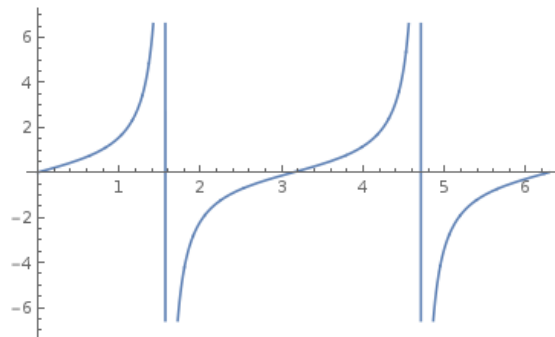


Figure 1: Plot of $\tan(x)$ generated with the Wolfram API

```
\graphic{ListPlot[ {1,2,2.5,2.9,3} ,PlotStyle->Red,Axes->False,Frame->True]}\{plot}
```

```
\begin{figure}[h!]  
\centering  
\includegraphics[width=0.6\textwidth]{plot.png}  
\caption{Some points plotted with the Wolfram API}  
\end{figure}
```

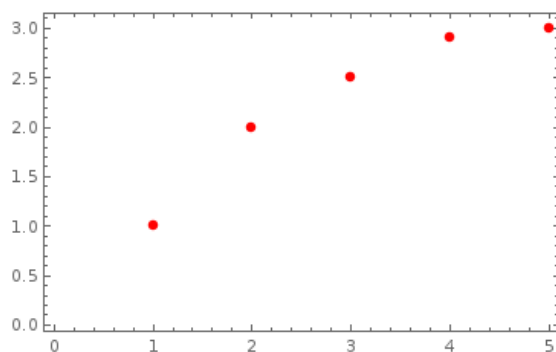


Figure 2: Some points plotted with the Wolfram API

Additionally, α -**T_EX** supports error bars.

```
\graphic{ErrorListPlot[{{0.5,0.1},{1,0.1},{1.7,0.5},{2,0.1},{3,0.2}}]}\{plot}
```

```
\begin{figure}[h!]  
\centering  
\includegraphics[width=0.6\textwidth]{plot.png}  
\caption{Error Plot generated with the Wolfram API}  
\end{figure}
```

The `\graphic` command is (as the name would suggest) not restricted to scientific or mathematical plots.

```
\graphic{GeoGraphics[Frame->True]}\{map}
```

```
\begin{figure}[h!]  
\centering  
\includegraphics[width=0.6\textwidth]{map.png}  
\caption{A map}  
\end{figure}
```

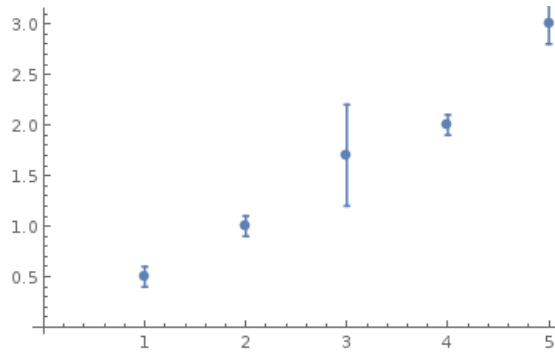


Figure 3: Error Plot generated with the Wolfram API

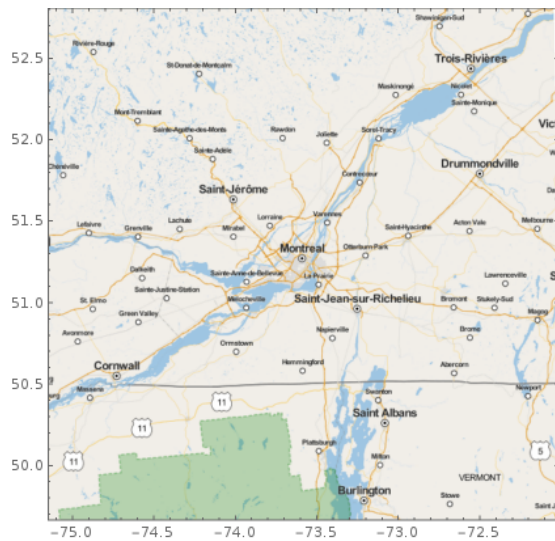


Figure 4: A map

Using Data Files

If you would like to make a plot using data stored in files on your computer, you can use α -**T_EX**'s `\dataplotTXT` command.

The file `data.txt` contains a list of numbers generated using the Wolfram Language.

```
\dataplotTXT{data.txt}{ListLinePlot}{dataplot}

\begin{figure}[h!]
\centering
\includegraphics[width=0.6\textwidth]{dataplot.png}
```

```
\caption{Plot of random dataset stored in a separate file}
\end{figure}
```

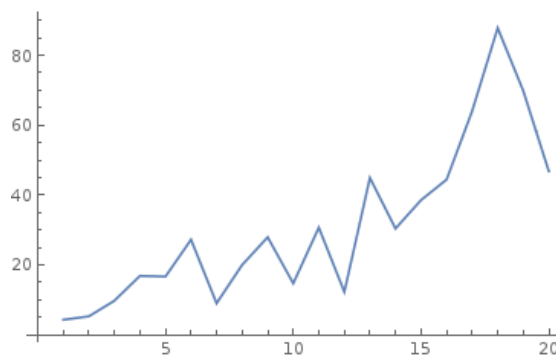


Figure 5: Plot of random dataset stored in a separate file

3D Graphics

α -**T_EX** also allows for remote 3D graphics, such as this [quadratic](#) , this [sphere](#) and this [sinusoid](#) . This functionality requires that the CDF plugin is installed on you computer

Wolfram Alpha

Additionally, α -**T_EX** can take Wolfram Alpha input and insert the results into your document.

The biggest city in China is $\$ \backslash \text{WolframAlpha} \{ \text{biggest city in china} \} \$$.

The biggest city in China is Shanghai.

The integral of $\$ \backslash \sin(x) \$$ is $\$ \backslash \text{WolframAlphaMath} \{ \text{integrate sinx} \} \$$.

The integral of $\sin(x)$ is $-\cos(x)$.

α -**T_EX** was built as a project for HackPrinceton 2014.

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