α-$\mathbf{T_EX}$

LaTeX Meets Wolfram

α-$\mathbf{T_EX}$ is a LaTeX package which incorporates the typesetting ease and control of LaTeX with the power of the Wolfram Language. The goal of α-$\mathbf{T_EX}$ is to provide the most complete, powerful and self-suficient typesetting environment.

```
\usepackage{alphatex}
```

Graphics

the *graphic* command generates a graphic and saves it to your directory to be used later in your LaTeX 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}
```

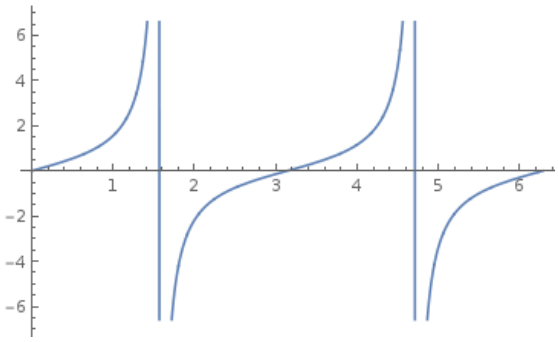

Figure 1: Plot of $\tan(x)$ generated with the Wolfram API

```
\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}
```

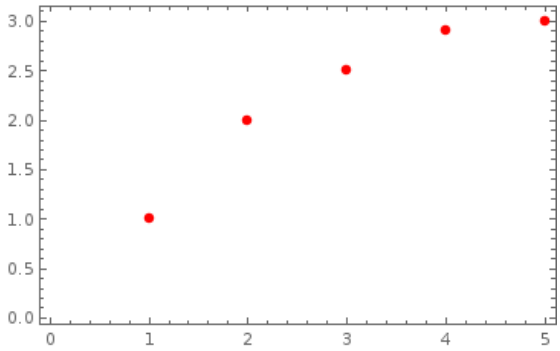

Figure 2: Some points plotted with the Wolfram API

Additionally, α-$\mathbf{T_EX}$ 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}
```

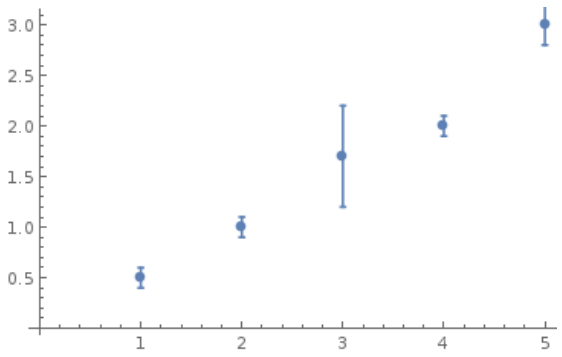

Figure 3: Error Plot generated with the Wolfram API

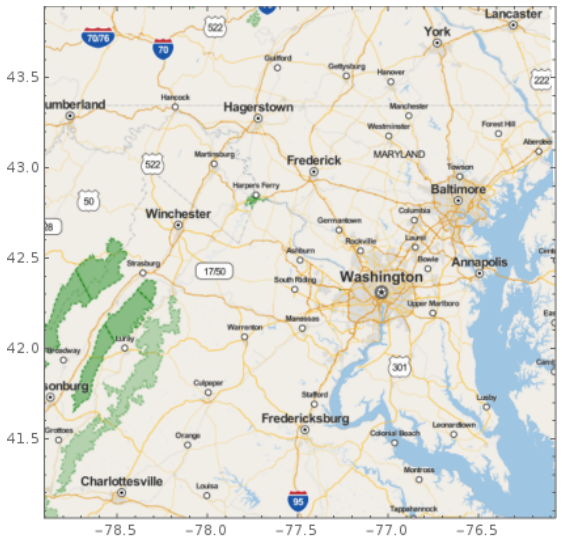

Figure 4: A map

Using Data Files

If you would like to make a plot using data stored in files on your computer, you can use α-**T$_{\mathbf{E}}$X** '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 seperate file}
\end{figure}
```

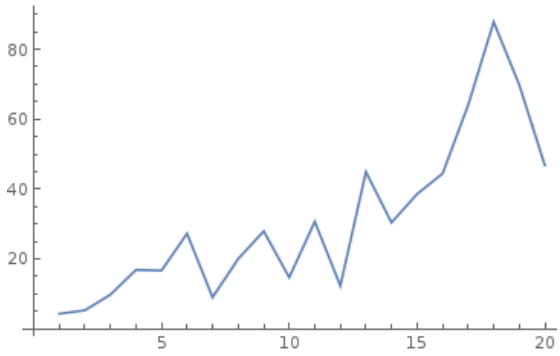

Figure 5: Plot of random dataset stored in a seperate file

3D Graphics

α-$\mathbf{T_EX}$ 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 your computer.

Calculations

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

```
$3\times4\sin\left(\frac{\pi}{4}\right)=$\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}$
```

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

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

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

Wolfram Alpha

Additionally, α-$\mathbf{T_EX}$ can take Wolfram Alpha input and insert the results into your document.

```
The biggest city in china is $\WolframAlpha{ biggest city in china }$.
```

The biggest city in china is Shanghai.

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

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

α-$\mathbf{T_EX}$ was built as a project for HackPrinceton 2014.
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