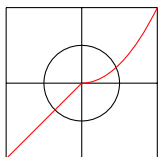


L^AT_EX Graphics

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- Internal graphics with Tikz.

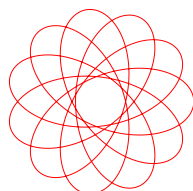
```
\usepackage{tikz}
\begin{document}
\begin{tikzpicture}
\draw (0,0) grid (2,2);
\draw (1,1) circle (0.5cm);
\draw[red] (0,0) -- (1,1) parabola (2,2);
\end{tikzpicture}
```



The package Tikz is part of the larger package PGF. In this package you describe the picture using commands and a kind of programming language. It is powerful, and produces good looking results, but complicated pictures may require more work than you want to do. For more information see the user manual for PGF.

- External graphics.

```
\usepackage{graphicx}
\begin{document}
\includegraphics[width=1in]{hypocycloid}
```



In the example shown, L^AT_EX will look for a file `hypocycloid` in the same directory as the main L^AT_EX input file. More specifically, it will look for `hypocycloid.png`, `hypocycloid.pdf`, or `hypocycloid.jpg`, in this order. It will then include the graphic file in the output, scaling it to have a width of 1 inch.

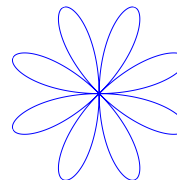
All of this assumes that the graphics file `hypocycloid` has been previously created, probably by some other program. Also, for the file types described, I've assumed that you're using `pdflatex`, i.e. you're set to create PDF files directly from your L^AT_EX file. For more information see the user manual for `graphics`, or the file `epslatex`, available online.

- EPS files. Using `pdflatex` you cannot directly include EPS (Encapsulated PostScript) files. But, in most current L^AT_EX versions they can be converted automatically, in the background, to PDF files, which are then included. The resulting PDF file gets a name such as `foo-eps-converted-to.pdf`. For more information see the `epstopdf` package or the TeXLive documentation.
- Positioning graphics. Most of the time you should put a graphic between paragraphs, maybe in `\begin{center} ... \end{center}`.
- Floating graphics. In professionally made books, the pictures are allowed to float. The purpose of floating is to prevent a picture from going off the bottom of the page or creating large gaps of space. (The other way to prevent this is to manually move text and graphics around, which isn't feasible with long documents.) Roughly speaking, instead of telling L^AT_EX "put this graphic here" you say "put this graphic somewhere on this page" and then

Figure 1: Input and output of a figure

```
Believe it or not, \emph{this}
\begin{figure}
\caption{Input and output of a figure}
\label{figure:graph_answer}
\includegraphics[width=1in]{rose_petal}
\end{figure}
```

is where I entered the code shown in Figure~
`\ref{figure:graph_answer}`
above.



you tell your reader "The graphic in Figure 1 shows the answer". For more information, see the file `epslatex`, available online.

Believe it or not, *this* is where I entered the code shown in Figure 1 above.

- Controlling floats. Floats position figures (and tables, and other things) automatically, but sometimes you'd like to modify or overrule the automatic options. Various settings and packages let you do this. Read the page <http://www.tex.ac.uk/cgi-bin/texfaq2html?label=floating> for more information.
- It's also possible to wrap text around a figure, as in the first two pictures in this document, although this does not work automatically in lists. See the package `wrappig` for documentation.
- You'll get the best looking results by using graphics made in some high quality, vector format such as EPS, or produced by Tikz, or in PDF provided this was made from a vector graphic format. In other words, anything *except* JPEG, TIFF, GIF, screenshots, or any other bitmap format. Next to the rest of the text produced by L^AT_EX, all bitmap formats will look inferior.
- Pretty much everything I make comes from two graphics sources: Tikz and Maple, a computer algebra program.
I use Tikz when the picture is relatively simple. I use Maple when the picture involves specific functions or calculations. It's possible to combine Tikz and Maple in a single picture, but I usually create each picture entirely in one or the other.
- One final recommendation: Do your graphics in such a way that it's easy to make changes and revisions later. To wit: save the Maple code, work in batch mode when possible, give the files meaningful names.