

Basic L^AT_EX Template

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Abstract

A sample L^AT_EX document

Introduction

L^AT_EX is *the* tool of choice for creating nicely formatted mathematical documents. It's not a standard word processor, however, and has a bit more of a learning curve. Once you get the hang of it, though, the payoff is tremendous. The purpose of this document is to help get you started.

The first step is to get yourself a T_EX distribution. I recommend:

- MacTeX for the Mac: <https://tug.org/mactex/>
- TeXLive for the Linux: <https://www.tug.org/texlive/>
- MiKTeX for the PC: <http://miktex.org/> (or so I'm told)
- Overleaf for an online experience: <http://www.overleaf.com/>

L^AT_EX documents are prepared with a simple text editor - *not* a word processor. Your L^AT_EX distribution should come with a good L^AT_EX-aware text editor. You type funky looking computer code and then process it into a PDF. The easiest way to start a project is just to open a working file and replace the text with your own and I recommend that you do that with this document.

Some math

Of course, one major thing we want to do is type some beautiful math. As a first example, let's look at the definition of iteration:

If $f(x) = x^2$, then the iterates of f from an initial point x_0 are computed via

$$x_{n+1} = f(x_n).$$

Typing it

To create that lovely piece of typeset mathematics, I simply typed in

```
\noindent If  $f(x)=x^2$ , then the iterates of  $f$  from an initial point  
 $x_0$  are computed via  

$$x_{n+1} = f(x_n).$$

```

We have some experience with this already - at least, we've seen snippets like x_0 and
$$x_{n+1} = f(x_n)$$
 to represent inline and displaystyle typeset mathematics before. There are some other commands that control the structure of the document as well, though, particularly when we look at the overall document as a whole. Before we get into all that, let's look into one more piece of math that you might need.

The Lorenz equations

The *Lorenz equations* say that

$$\begin{aligned}x' &= \sigma(y - x) \\y' &= x(\rho - z) - y \\z' &= xy - \beta z,\end{aligned}$$

where the notation x' denotes the rate of change of x with respect to time.

Typing the Lorenz equations

In order to create that set of equations, I typed in the following:

```
The \textit{Lorenz equations} say that
\begin{align*}
x' &= \sigma(y-x) \\
y' &= x(\rho-z)-y \\
z' &= xy-\beta z,
\end{align*}
where the notation  $x'$  denotes the rate of change of  $x$  with
respect to time.
```

You can view the source to see how the rest of the document was created.

Including an image

Often we'd like to incorporate a graph into our file, like the one shown in figure 1.

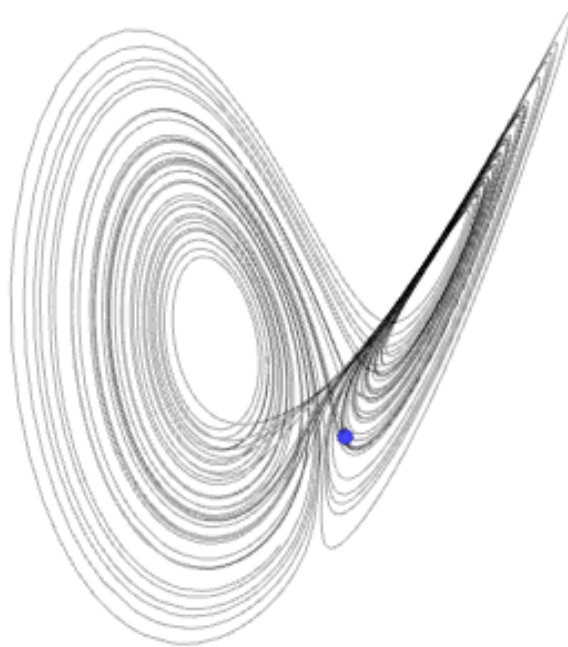


Figure 1: The Lorenz attractor