

L^AT_EX

David Murdock, TTU

1 Why You Need L^AT_EX

Eventually in your career as a physicist or mathematician your ideas and findings will *matter* and you will need to communicate those ideas to other people. Computers and word processors have made written communication relatively easy, but most word processors do *not* meet the needs of physicists. In physics and math we need to create documents which:

- Contain a lot of equations which we'd like to have printed as clearly as possible. "Textbook quality" is desirable!
- Are formatted by the software, allowing us to spend our time doing more physics and math. This includes the numbering of the parts of a document, especially the equations, figures and sections.
- Are *completely* transportable between different computers and different operating systems on those computers. Scientists use different kinds of computers!

To meet these needs a computer scientist named Donald Knuth came up with a powerful system of *typesetting* called T_EX. Later, a programmer named Leslie Lamport made the system simpler by changing the commands somewhat (this was possible because of the re-programmable nature of the T_EX system) and created the typesetting system known as L^AT_EX. L^AT_EX has now become the standard for producing high-quality documents in physics and math.

It is true that much can be done with MS Word and its "pull-down" equation editor, and it is true that the "learning curve" for the MS Word system is not as steep as with L^AT_EX, since modern word processors give immediate visual confirmation of what will show up on the paper. But the results are just not as good.

2 What Is L^AT_EX?

First off, L^AT_EX is *not* a word processing program; it is best called a *typesetting system*. In an ordinary text ("ASCII") file you input the basic text of the document along

with special commands which will produce the desired formatting of the document. Included in the input are the equations, which have their own special commands for positioning the symbols.

3 What Do I Need To Use \LaTeX ?

\LaTeX can be used on any modern PC or Mac system. You will need to get the software, of course, but there are *free* versions to be downloaded from the web. You just need to get the files and install them.

On many academic systems \LaTeX is already installed and someone can tell you how to use it!

In addition to the \TeX software, you need a text editing program. All computer systems have these, but some editors are more powerful than others. UNIX and Windows systems come with simple text editors but you can get better ones for free or at small cost from the web.

4 But Isn't It Complicated?

It is true that if you want to use \LaTeX to write a book or make a document with lots of illustrations then you will have to learn lots of technical details about the formatting commands. But you can start simple, enter some text and a few equations and gradually throw in more and more formatting tricks as you learn them.

Some people put off learning about this powerful system because they think they can't learn the entire system at once. And they *can't*... but there's no reason not to start simple and work your way up!

5 Then Show Me Something Simple!

If you can create a text file with the following lines, you can make a \LaTeX file! Try:

```
\documentclass[12pt]{article}
\begin{document}

Hi Mom!

\end{document}
```

If you can get this to work, you can move up to bigger things.

The file/document `latexut.tex` included with this lecture is intended to give you a brief sampling of the basic syntax of \LaTeX but also to give you a running start

in using the system. You may want to grab this file and substitute your own text, equations and tables for the silly material that is in that document.

6 Sounds Great, Dave. My Check Is in the Mail. But What's the Catch?

The catch is that \LaTeX is a system for creating your *professional* documents; as such, it does not have some of the convenient features of today's bloated word processors. Specifically:

Unless you are using a WYSIWYG front end for \LaTeX you must *compile* the documents that you create, and there may be errors. You will have to fix them.

In the basic installations of \LaTeX there are a limited number of fonts you can use in a document. This is not a limitation for serious work because those cutesy fonts which have the i's dotted with little hearts are usually out of place in *Physical Review*.

Most importantly, it is not so easy for you to include graphics with your documents. You will find this to be a drawback only at first; later on you can learn how to use a \LaTeX graphics "package" (for example the popular **graphicx**) which will take the fine postscript figures that you have created and put them in the document, properly sized. Once you get the hang of that, illustrations are not hard to put into a \LaTeX document.

7 So How Would I Make Up a Newsletter for My Club with Pictures of Our Last Picnic and...

Use MS Word.