

An Introduction to L^AT_EX

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What Is L^AT_EX

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L^AT_EX

Jeff Clark

What Is L^AT_EX

Not WYSIWYG

Finding L^AT_EX On
Elon Computers

Examples

Installing L^AT_EX on
Your Computer

L^AT_EX References

- ▶ L^AT_EX is a mathematical typesetting system. It is capable of producing output ready for publication in journals and books, with much higher quality than that of word processors.

What Is \LaTeX

- ▶ \LaTeX is a mathematical typesetting system. It is capable of producing output ready for publication in journals and books, with much higher quality than that of word processors.
- ▶ \LaTeX is the standard for higher level mathematics at Elon (and in most mathematical journals) not just because of its appearance; it also enforces good structure in documents, separating out content and organization from style and appearance.

Not WYSIWYG

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Not WYSIWYG

- ▶ Because \LaTeX involves typesetting complicated mathematical expressions, it is not a what-you-see-is-what-you-get word processor.
- ▶ You create a source \LaTeX file, and preview your results periodically as you edit it.
- ▶ When you are satisfied with the output, you then send it to the printer.

Finding \LaTeX On Elon Computers

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\LaTeX References

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Finding L^AT_EX On Elon Computers

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- ▶ The different commands for compiling a file, previewing the results, and printing are combined in one program *TeXnicCenter*.

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- ▶ The different commands for compiling a file, previewing the results, and printing are combined in one program *TeXnicCenter*.
- ▶ To start *TeXnicCenter*, go to the *Start* button, to the list of *Programs*, to the *Mathematics* programs, to *L^AT_EX*, and then to *TeXnicCenter*.

Finding L^AT_EX On Elon Computers

- ▶ L^AT_EX is located on almost all of the PC's located in Elon's computer labs and the library.
- ▶ The different commands for compiling a file, previewing the results, and printing are combined in one program *TeXnicCenter*.
- ▶ To start *TeXnicCenter*, go to the *Start* button, to the list of *Programs*, to the *Mathematics* programs, to *L^AT_EX*, and then to *TeXnicCenter*.
- ▶ As you create your L^AT_EX file, you will need to save it before you can do anything with it.

What Every \LaTeX File Should Have

- ▶ Every \LaTeX file should contain the following lines.

```
\documentclass{article}
\usepackage{amsmath}
\title{Your Title}
\author{Your Name}
\date{The Date of This Draft}
\begin{document}
\maketitle
\end{document}
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- ▶ You should always include the title information for your readers but also for yourself when you look at the file at a later date and need to remember what the document was about.
- ▶ All content should go between the beginning and end of a document.

Plain Text

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- ▶ Separate paragraphs by one or more blank lines.
- ▶ Save your document, then press the compile/preview button.
- ▶ \LaTeX will by default try to find good line breaks (hyphenating where necessary) and good page breaks.

$$\begin{aligned}r &= 2 \sin(\theta) + 2 \cos(\theta) \\r &= 2 \left(\frac{y}{r}\right) + 2 \left(\frac{x}{r}\right) \\r^2 &= 2y + 2x \\x^2 + y^2 &= 2x + 2y\end{aligned}$$

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```

$$\begin{aligned}\lim_{n \rightarrow \infty} \left| \frac{x^{n+1} / (2^{n+1} + 5)}{x^n / (2^n + 5)} \right| &= |x| \lim_{n \rightarrow \infty} \left| \frac{2^n + 5}{2^{n+1} + 5} \right| \\ &= \frac{|x|}{2}\end{aligned}$$

```
\begin{align*}
\lim_{n \to \infty} \left| \frac{x^{n+1}}{2^{n+1} + 5} \right|
\left| \frac{x^n}{2^n + 5} \right|
&= |x| \lim_{n \to \infty} \left| \frac{2^n + 5}{2^{n+1} + 5} \right| \\
&= \frac{|x|}{2}
\end{align*}
```

$$\frac{dw}{dt} = \frac{\partial w}{\partial x} \frac{dx}{dt} + \frac{\partial w}{\partial y} \frac{dy}{dt} + \frac{\partial w}{\partial z} \frac{dz}{dt}$$

```
\begin{align*}
\frac{dw}{dt}&=
\frac{\partial w}{\partial x}\frac{dx}{dt}
+ \frac{\partial w}{\partial y}\frac{dy}{dt}
+ \frac{\partial w}{\partial z}\frac{dz}{dt}
\end{align*}
```

$$\begin{aligned}\int_0^{2\pi} \sqrt{5}e^{2\theta} d\theta &= \frac{\sqrt{5}}{2} e^{2\theta} \Big|_0^{2\pi} \\ &= \frac{\sqrt{5}}{2} e^{4\pi} - \frac{\sqrt{5}}{2} e^0 \\ &= \frac{\sqrt{5}}{2} (e^{4\pi} - 1)\end{aligned}$$

```
\begin{align*}
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&= \left. \frac{\sqrt{5}}{2} e^{2\theta} \right|_0^{2\pi} \\
&= \frac{\sqrt{5}}{2} e^{4\pi}
- \frac{\sqrt{5}}{2} e^0 \\
&= \frac{\sqrt{5}}{2} (e^{4\pi} - 1)
\end{align*}
```

Bullet Lists

- ▶ Conic sections
 - ▶ Parametric equations
 - ▶ Polar coordinates
 - ▶ Vectors
 - ▶ Multivariable functions
 - ▶ Partial derivatives
 - ▶ Multiple integrals
-

```
\begin{itemize}
\item Conic sections
\item Parametric equations
\item Polar coordinates
\item Vectors
\item Multivariable functions
\item Partial derivatives
\item Multiple integrals
\end{itemize}
```

Outline Lists

1. Conic sections
 - a. Parabola
 - b. Ellipse
 - c. Hyperbola
 2. Parametric equations
 - a. Graphing
-

```
\begin{enumerate}
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Description Lists

[Exercise 2.2.1, page 43](#): Verify, using the definition of convergence of a sequence, that the following sequences converge to the proposed limit.

[Exercise 2.2.2, page 43](#): What happens if we reverse the order of the quantifiers in Definition 2.2.3?

```
\begin{description}
\item[Exercise~2.2.1, page~43:]
Verify, using the definition of convergence of
a sequence, that the following sequences converge
to the proposed limit.
\item[Exercise~2.2.2, page~43:]
What happens if we reverse the order of the
quantifiers in Definition~2.2.3?
\end{description}
```

Installing L^AT_EX on Your Computer

- ▶ Dr. Jim Beuerle has been managing the installation of L^AT_EX on Elon computers for several years now. He has links on the following web-site that will help you to install L^AT_EX on Windows machines.

<http://math.elon.edu/~jbeuerle>

Follow the link on the left for *Software and Technology*.

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Follow the link on the left for *Software and Technology*.

- ▶ L^AT_EX is available for other operating systems. The home page for all things related to L^AT_EX is:

<http://www.ctan.org>

- ▶ CTAN (Comprehensive T_EX Archive Network) has many documents to help with L^AT_EX at <http://www.ctan.org>.

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- ▶ My home page <http://frodo.elon.edu> contains a number of links to L^AT_EX references and a short tutorial.
- ▶ If you are interested in an actual book, I have found *Guide to L^AT_EX* by Kopka and Daly to be the one that I always keep near my computer.