

Everything To Do With L^AT_EX

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Ambitiously incorporating both an introduction to L^AT_EX for those who've never used it and an exploration of the weirder things that can be done with it, this talk will amuse, amaze, confuse and something else that rhymes with amaze.

Outline of Talk

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- Installing L^AT_EX
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- Packages
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- Drawings
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- Go Diagrams
- Ελληνικός!
- Other things I do with L^AT_EX
- Other Strange Ideas
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L^AT_EX: what is it?

“L^AT_EX is a high-quality typesetting system; it includes features designed for the production of technical and scientific documentation. L^AT_EX is the de facto standard for the communication and publication of scientific documents.” - So says the official L^AT_EX project.

“T_EX is a [new] typesetting system intended for the creation of beautiful books - and especially for books that contain a lot of mathematics.” - Donald Knuth, the foreword to The TeXbook, 1984.

Installing L^AT_EX

L^AT_EX is fundamentally designed for Unix-like systems, but can now be used on Windows and MacOS machines without difficulty.

Using L^AT_EX: the basics

- An Editor
- A Commandline or Compiling Tool
- A Viewer

Packages

Rather than have all functionality available all of the time, L^AT_EX is relatively minimal. To do anything unusual, you need

```
\usepackage [packageoptions] {packagename}
in your document pre-ambble.
```

Thus your basic document is structured:

```
\documentclass [options] {class}
\usepackage [options] {package} (repeat as required)
\begin{document} Content, with markup. \end{document}
```

Equations

$$\frac{\partial f}{\partial t} = \left[\sum_{i=1}^N \sum_{j=1}^N \frac{\partial^2}{\partial x_i \partial x_j} D_{ij}^2(x_1, \dots, x_N) - \sum_{i=1}^N \frac{\partial}{\partial x_i} D_i^1(x_1, \dots, x_N) \right] f$$

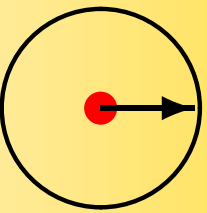
For those wondering, this is the general form of the Fokker-Planck equation describing the time evolution of the probability density function of position and velocity of a particle.

```
\frac{\partial f}{\partial t} = \left[ \sum_{i=1}^N \sum_{j=1}^N \frac{\partial^2}{\partial x_i \partial x_j} D_{ij}^2(x_1, \dots, x_N) - \sum_{i=1}^N \frac{\partial}{\partial x_i} D_i^1(x_1, \dots, x_N) \right] f
```

More simply, $F = m \frac{dv}{dt}$ is $F = m \frac{dv}{dt}$

Drawings

L^AT_EX has a simple drawing package which can be used to make many diagrams.



```
\begin{picture}(3,1.6) \thicklines
\color{red} { \put(1,1){\circle*{0.2}} }
}\normalcolor \put(1,1){\circle{1.2}} }
\put(1,1){\vector(0,1){0.6}} }
```



Alternatively, of course, we can simply insert a picture having loaded the `graphics` package.

```
\includegraphics*[width=2cm]{tux.eps}
```

References - Inside and Out

- Internal References: For mentioning figures, tables, illustrations or other sections.

```
\caption{\label{wirutable}Table showing the
properties of the wires used in this
experiment.}
```

This table can then be referenced anywhere in the document: for example,

```
Table \ref{wirutable}, on page
\pageref{wirutable}, shows ...
```

- Bibliographies and Citations:
 - “thebibliography”
 - BIBTeX

Creating Commands and Packages

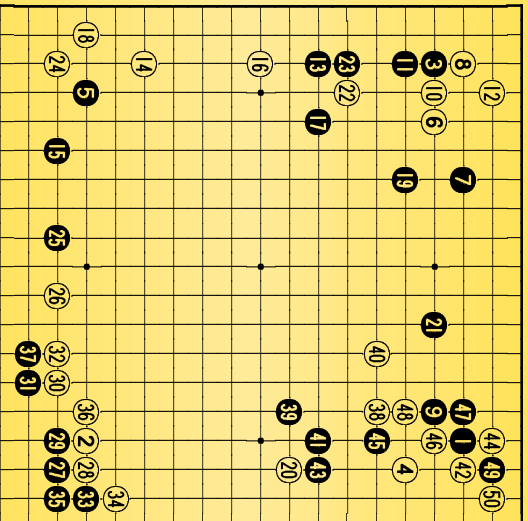
Creating one's own commands and macros is a simple way to make L^AT_EX yet more powerful and user-friendly. For example, I have a file in

```
~/texmf/tex/latex/mymacros/mymacros.sty
```

I load `\usepackage{mymacros}` in most L^AT_EX documents which I write. This defines, for example, `\newcommand{\degC}{\textcircled{C}}` I found I was always forgetting how to produce the very useful `\textcircled{C}` unit - by defining it myself, I was able to use something I remembered.

Go Diagrams

Typesetting Go programs uses the package `i-go`: with this package loaded we produce the diagram with:



```
\blackl[1]{q17, q4, c16, r15, d4, e16, g17, c17,
p16, d16, c15, d18, c12, c6, f3, c10, e12, b4, g15,
r11, m16, d13, c13, c3, j3, l3, r3, r4, q3, o3, o2,
n3, s4, s5, s3, p4, n2, p14, p11, n14, q12, r17, r12,
q18, q14, q16, p17, p15, r18, s18} \showgoban
```

For those wondering, these are the first 50 moves in the final game at the 2007 London Open, between Shaoyou Ouyang and Csaba Mero.

The co-ordinate system is converted from SGF format – in an ideal world, there would be a simple converter, and one of these days I'll write one if someone else doesn't do it first.

Other things I do with L^AT_EX

- Letters
- CVs and job applications
- Invoices
- Posters and publicity
- Leaflets and fliers
- slides

Other Strange Ideas

L^AT_EX is of course Turing Complete. That is to say: any computable thing can be computed with it. This is not to say that it is a good idea to try ...

Suggestions received for interesting programs to write in L^AT_EX, when I was foolish enough to ask some geeks, included:

- Write an HD-DVD DeCSS library
- Do in-language-calculations with latex, like with postscript - simple things like displaying a mandelbrot-set ...
- Create an invoice system
- create an accounts ledger (`\income [cheque] {3.50}`)

Further Reading

- My two favourite L^AT_EX books: Helmut Kopka and Patrick Daly's "Guide to L^AT_EX" and Frank Mittelbach and Michel Goossen's "The L^AT_EX Companion". (The latest edition of both is generally advised - and available in the CompSoc library as well as the University library.)
- The L^AT_EX Project's website, <http://www.latex-project.org/>, has lots of useful tips, hints and places to start.
- The Comprehensive T_EX Archive Network, <http://ctan.org/> has introductions and all the packages you can possibly imagine.
- The T_EX User Group, <http://www.tug.org/>, has all sorts of help and information.