



Getting Started with L^AT_EX

And why I don't use Word anymore



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What is L^AT_EX?

A bit of Background

- Widely regarded as the standard typesetting method for academic journals
 - Far easier to present data, equations
 - Much easier to cite references (i.e. automatic footnotes, hyperlinking etc.)
 - Separates content from the formatting of documents

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 - Separates content from the formatting of documents
- Far more control over many aspects of the document
 - Backend rather than frontend (e.g. Word)
 - Images won't disappear when moved slightly
 - Everything is where you tell it to be

- Files can be as big as needed, don't need to worry about a 30+ page Word doc crashing
- Multi-file documents are very easy to achieve, no post-processing
- It looks **pretty**

Something to keep in mind throughout this presentation: *every single slide* is done in *LATEX*

What can I do?

In short: anything you can do with Word + much much more!!

Images



Diagrams from scratch:

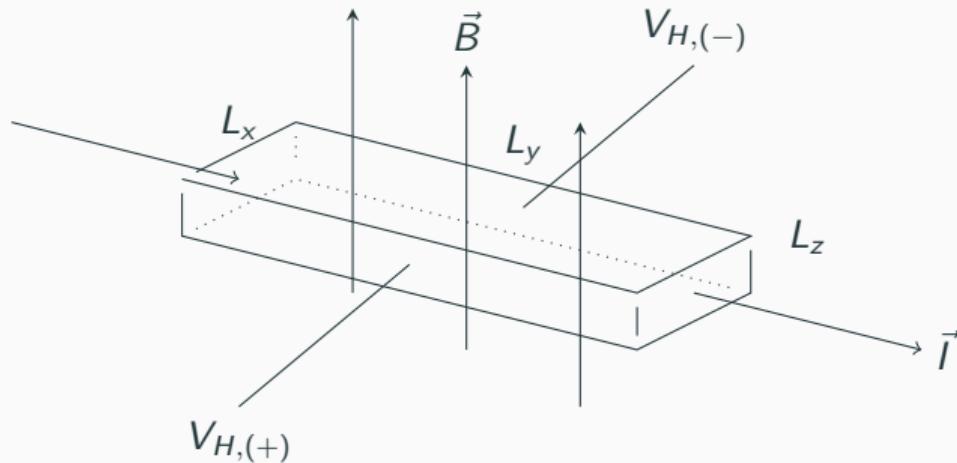


Figure 1: Semiconductor sample in B field

GIFS:



- Inline:

It is known that $y = x^2 + 2x + 4$ is a parabola.

- Block:

Here is a Fourier transform:

$$\mathcal{F}(\omega) = \int_{-\infty}^{\infty} f(t) e^{i\omega t} dt$$

- Numbered:

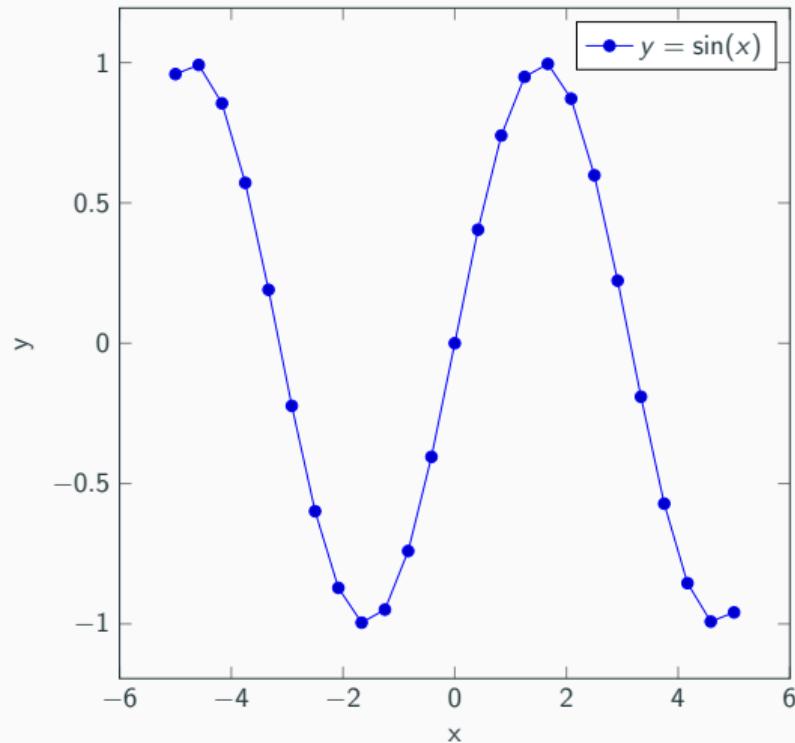
$$|+_{\times}\rangle = \frac{1}{\sqrt{2}} |+\rangle + \frac{1}{\sqrt{2}} |-\rangle \quad (1a)$$

$$|-_{\times}\rangle = -\frac{1}{\sqrt{2}} |+\rangle + \frac{1}{\sqrt{2}} |-\rangle \quad (1b)$$

$$|\langle +|+_{\times}\rangle|^2 = 0.5 \quad (1c)$$

Plots

Using gnuplot:



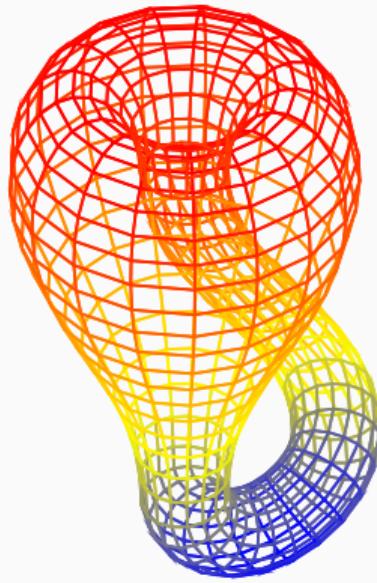
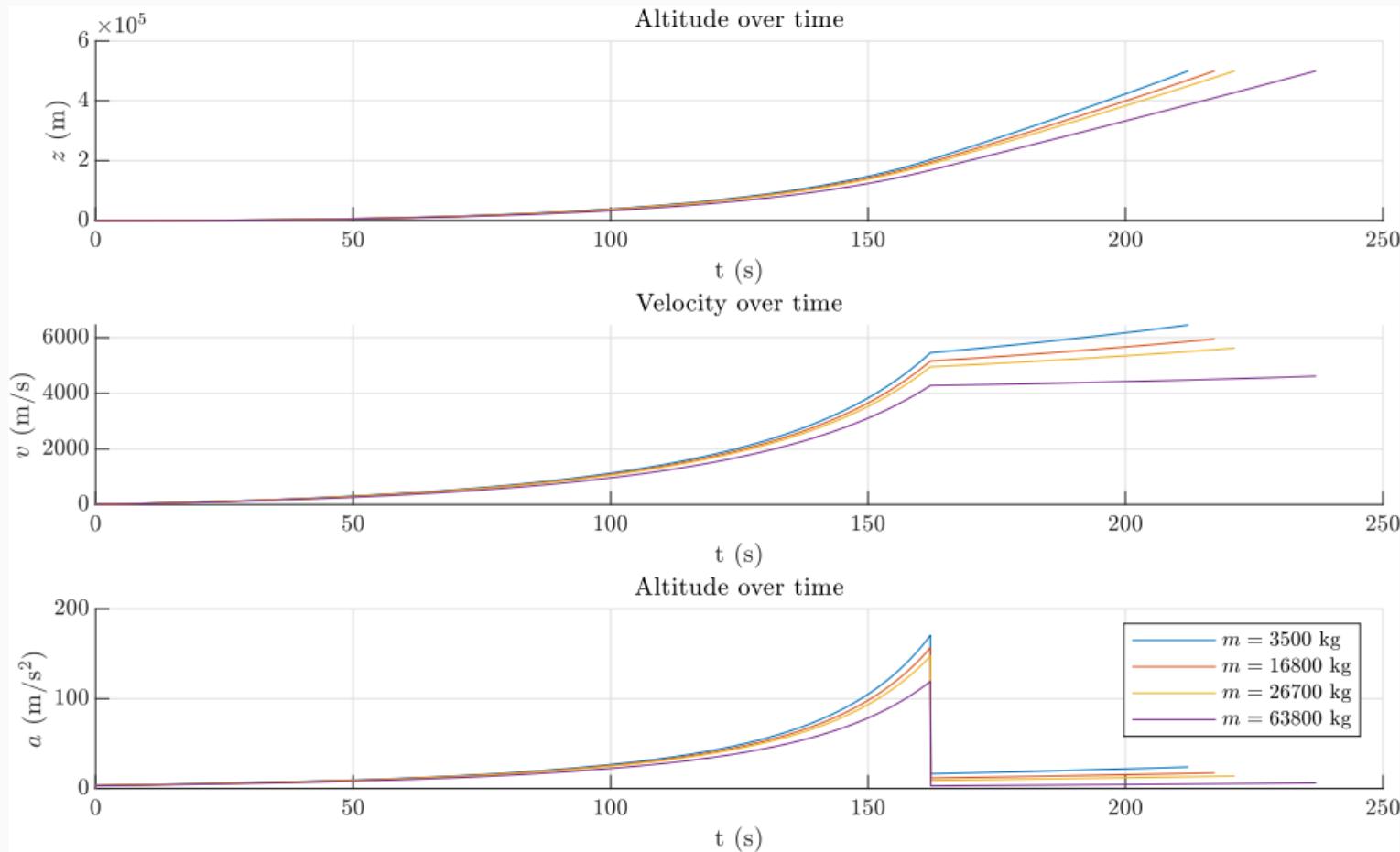


Figure 2: A Klein Bottle plotted via pgfplots/gnuplot

MATLAB Plots:



Other Cool Stuff

I'm interested! How do I start learning?

Programs/Compilers

MikTex Standalone L^AT_EXcompiler and editor. Good for local installations on Windows.

- Very easy to use
- Good package support from CTAN (Comprehensive TeX Archive Network)
- Not the prettiest
- THE WHITE - IT BURNS

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Overleaf Web based, cloud storage. The Google Docs of \LaTeX .

- Very easy to use
- GitHub integration
- Free Pro+ account by registering as a USYD student/staff member
- Multiple author editing
- Some packages might not be recognisable

We'll be using Overleaf
overleaf.com

Starting off a Document

Define document class:

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

Begin document:

```
\begin{document}
```

```
<insert document content here>
```

```
\end{document}
```

Well done! You've just told \LaTeX to create a new, blank document!
So... is that it?

Not in the slightest!

The Preamble

Everything before `\begin{document}` is known as the **preamble**. Let's start customising this.

```
\documentclass{article}
\title{My Title}
\author{My Name}
\date{\today}
\begin{document}
\maketitle
...
\end{document}
```

Sections

```
\documentclass{article}
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\begin{document}
\maketitle
\section{My Section Name}
...
\end{document}
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Bonus: try adding \makecontents after \maketitle

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E.g. `\begin{equation}\dots\end{equation}`

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E.g. `\begin{equation}...\end{equation}`

$$\frac{d \sin x}{d \cos x} = -\cot x \tag{2}$$

and `\begin{align*}...\end{align*}`

$$F(s) = \mathcal{L}\{t\}$$

$$= \frac{1}{s}$$

Packages

You'll notice that `align*` doesn't work. The reason is, you haven't added the package necessary yet.

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After you've checked that works - load the `graphics` package.

Pictures

```
\begin{figure}[h!]
  \includegraphics{/path/to/figure}
  \caption{}
  \label{}
\end{figure}
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The [h!] component tells L^AT_EX to put the image exactly where you told it to. A big one-up on Word.

The best way to keep learning

There is thousands of packages for different things! The only way you can learn them is by going through and using them in documents. [Stackexchange is your friend.](#)

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Other things you can have \LaTeX do:

- Solve differential equations
- Plot natively in the document
- Presentations (like this one!)

**Other programs to help create
nice looking documents in L^AT_EX**

TikzEdt Semi-graphical tikz editor - very similar to the semiconductor drawing I showed earlier

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Extremely good integration

ImageMagick Handy command line image editor

Jack Naylor

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