

Getting Started with \LaTeX

And why I don't use Word anymore

Jack Naylor

August 15, 2018

Treasurer - PhySoc, University of Sydney



What is \LaTeX ?

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

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
- 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
- Multiple 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!!



Diagrams from scratch:

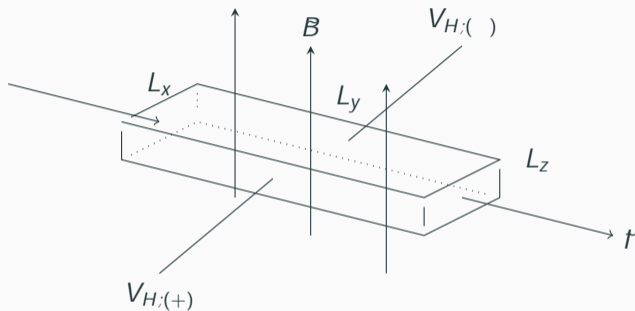


Figure 1: Semiconductor sample in B field

GIFS:



- Inline:

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

- Block:

Here is a Fourier transform:

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

- Numbered:

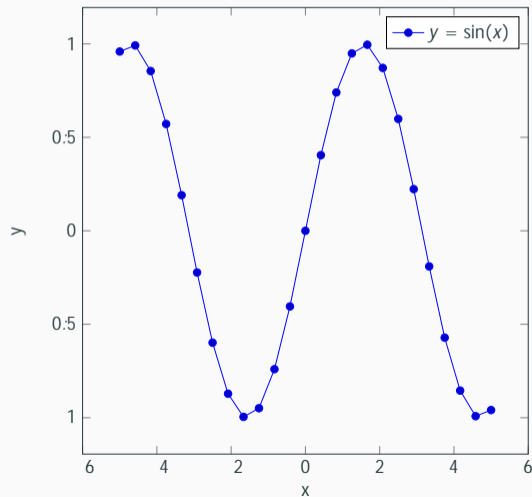
$$j + xi = \frac{1}{2}j + i + \frac{1}{2}j - i \quad (1a)$$

$$j - xi = \frac{1}{2}j + i + \frac{1}{2}j - i \quad (1b)$$

$$jh + j + xi + j^2 = 0.5 \quad (1c)$$

Plots

Using gnuplot:



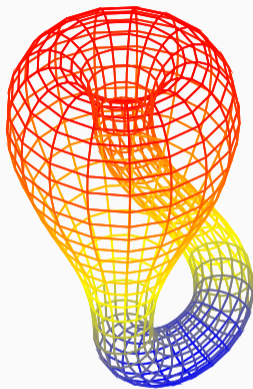
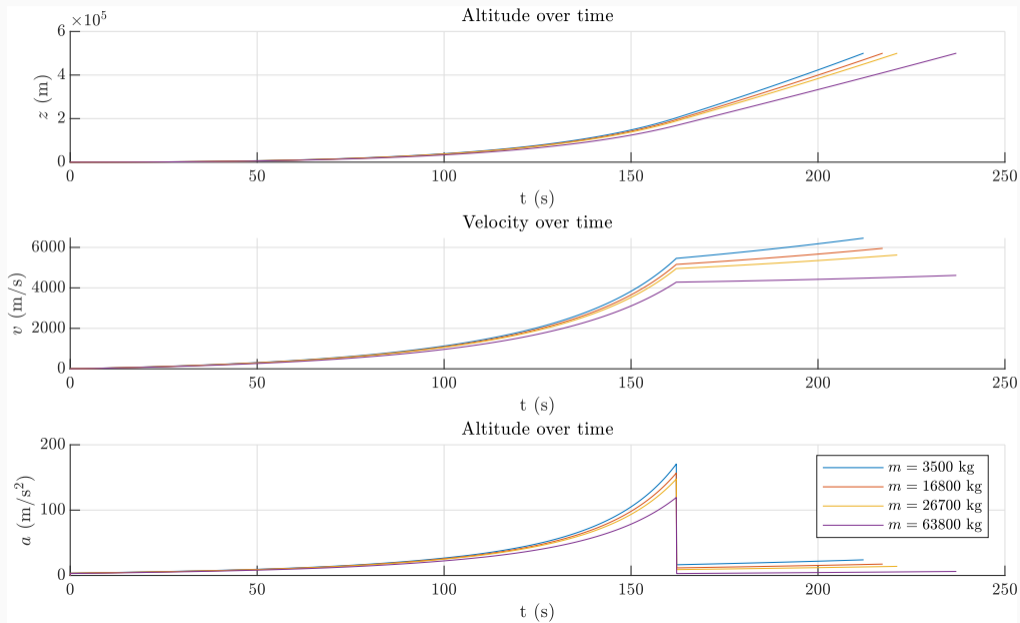


Figure 2: A Klein Bottle plotted via pgfplots/gnuplot

MATLAB Plots:



I'm interested! How do I start learning?

MikTeX Standalone \LaTeX compiler 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

MikTeX Standalone \LaTeX compiler 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

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:

```
ndocumentclass[12pt]{article}
```

Begin document:

```
nbegin{document}
```

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

```
nend{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}  
\title{My Title}  
\author{My Name}  
\date{\today}  
\begin{document}  
\maketitle  
\section{My Section Name}  
...  
\end{document}
```

Sections

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

Bonus: try adding `\tableofcontents` after `\maketitle`

Maths

Maths can be added pretty easily:

- $\tan \alpha$ gives tan

Maths can be added pretty easily:

- $\tan \alpha$ gives tan
- $\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$ gives

$$\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$$

Maths

Maths can be added pretty easily:

- $\tan \alpha$ gives tan
- $\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$ gives

$$\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$$

Maths also comes in environments:

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

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

Maths can be added pretty easily:

- $\tan \alpha$ gives tan
- $\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$ gives

$$\int_{-\infty}^{\infty} \frac{\cos x}{x^2+1} dx = \frac{\pi}{e}$$

Maths also comes in environments:

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

$$\frac{d \sin x}{d \cos x} = \cot x \quad (2)$$

and $\begin{align*} \dots \end{align*}$

$$\begin{aligned} F(s) &= Lftg \\ &= \frac{1}{s} \end{aligned}$$

Packages

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

Try including `\usepackage{amsmath}` in your preamble.

Packages

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

Try including `\usepackage{amsmath}` in your preamble.

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

Pictures

```
\begin{figure}[h!]  
  \includegraphics{/path/to/figure}  
  \caption{}  
  \label{}  
\end{figure}
```

Pictures

```
\begin{figure}[h!]  
  \includegraphics{/path/to/figure}  
  \caption{}  
  \label{}  
\end{figure}
```

The [h!] component tells \LaTeX 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.](#)

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](#).

The best way of continuing to learn \LaTeX is to [keep using it](#). We've only touched the tip of the iceberg as to what \LaTeX can do!

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](#).

The best way of continuing to learn \LaTeX is to [keep using it](#). We've only touched the tip of the iceberg as to what \LaTeX can do!

Other things you can have \LaTeX do:

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](#).

The best way of continuing to learn \LaTeX is to [keep using it](#). We've only touched the tip of the iceberg as to what \LaTeX can do!

Other things you can have \LaTeX do:

- Solve differential equations

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](#).

The best way of continuing to learn \LaTeX is to [keep using it](#). We've only touched the tip of the iceberg as to what \LaTeX can do!

Other things you can have \LaTeX do:

- Solve differential equations
- Plot natively in the document

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](#).

The best way of continuing to learn \LaTeX is to [keep using it](#). We've only touched the tip of the iceberg as to what \LaTeX can do!

Other things you can have \LaTeX do:

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

What happens if there's something I want to do that doesn't exist?

What happens if there's something I want to do that doesn't exist?

Make your own command: `\newcommand{name}[num]{definition}`

What happens if there's something I want to do that doesn't exist?

Make your own command: `\newcommand{name}[num]{definition}`

e.g. `\newcommand*\Eval [3]{\left. #1\right\rvert_{\#2}^{\#3}}`

What happens if there's something I want to do that doesn't exist?

Make your own command: `\newcommand{name}[num]{definition}`

e.g. `\newcommand*\Eval[3]{\left.#1\right\rvert_{\#2}^{\#3}}`

When I call `\Eval {x^2}{2}{3}` this gives $x^2 \Big|_2^3$

**Other programs to help create
nice looking documents in \LaTeX**

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

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

gnuplot Did those very nice plots earlier

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

gnuplot Did those very nice plots earlier

MATLAB You can change labels/ figure ticks so they look like they're native to L^AT_EX.
Extremely good integration

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

gnuplot Did those very nice plots earlier

MATLAB You can change labels/ figure ticks so they look like they're native to L^AT_EX.
Extremely good integration

ImageMagick Handy command line image editor

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

gnuplot Did those very nice plots earlier

MATLAB You can change labels/ figure ticks so they look like they're native to L^AT_EX.
Extremely good integration

ImageMagick Handy command line image editor

Mendeley Bibliography management: yes no more CiteThisForMe!

