

A Concise Introduction to L^AT_EX

Henry Yip
betelgeuse0125@gmail.com

July 27, 2022

Abstract

L^AT_EX is the formal format of submitting essays. No matter if you are a life science people or a physical science people you should most definitely learn the basics

0 Initialization

- Go to [the login page of Overleaf](#)
- Create a New Account ¹
- Press **New Project**
- Press **Blank Project** and enter your title

1 Preamble

- Below is an example of a **Preamble**

```
\documentclass{article}
\usepackage{amsmath}
\usepackage{amssymb}
\usepackage{parskip}
\usepackage[utf8]{inputenc}
\usepackage{titlesec}
\setcounter{secnumdepth}{4}
\titleformat{\paragraph}{}
{\normalfont\normalsize\bfseries}{\theparagraph}{1em}{}
\titlespacing*{\paragraph}
{0pt}{3.25ex plus 1ex minus .2ex}{1.5ex plus .2ex}
\newcommand{\ie}{\textit{i}. \textit{e}. }
\title{Introductory Astrophysics (PHYS08050) Notes}
\author{Henry Yip
s2231321@ed.ac.uk
}
```

¹You'll likely obtain a professional account if you login with your University Email, however, the differences are minimal, but auto-Github updates can be handy at times

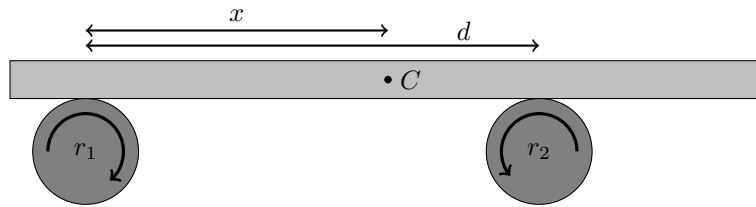


Figure 1: Advertisement **ALERT**: This image is created jointly by **Henry Yip** and **Lorian Richmond**. If you want to create Physics or Math documents with them please contact **Henry Yip**

1.1 Documentclass

- On the first line you can see `\documentclass{}`. As we are writing articles, we always put `\documentclass{articles}` in the brackets. If you want to include a report later on, you should put `\documentclass{report}`

²

1.2 Packages

- Packages are extensions of \LaTeX that allows you to include all sorts of things, like graphs, hyperlinks, math symbols and so on

1.2.1 Math Articles

- `\usepackage{amsmath}` and `\usepackage{amssymb}` are almost always required.
- **Tikz** is preferred if you want to draw graphs
- Below is a beautiful example!

1.3 Non-Math Articles

- You can include hyperlinks through `\usepackage{href}`
- There are pretty much all sorts of packages anywhere. For example, the `\usepackage{parskip}`
- You can **always** find your answer in [Stackexchange](#)

²If you want to write a \LaTeX tutorial on your own, remember that you can't just type the bolded words because the compiler would be ultra confused. Instead, search "escape characters" online and you'll see!

2 Title, Author and Date

- The Sample document has **Sample** as the default title, feel free to change to anything you want
- You can include several authors if you use the and function.
- `\`allows you to skip lines
- For the date, set as today
- After all these, start the document by `\begin{document}`. Remember to `\end{document}` when you finish
- Always include `\maketitle` after `\begin{document}`

3 Abstract

- You can include an Abstract by `\begin{abstract}`
- This can only be added after `\begin{document}`
- Always remember to `\end{abstract}`

4 Math Symbols

- One should search online for the math symbols supported by L^AT_EX. [Here](#) is a good guide
- More symbols can be downloaded through extra packages. For example, \hbar , \angle
- a \$ sign is **required** to show that you are entering math mode. For example: `\measuredangle` will show as \angle
- You can make your equations aligned also:

$$\Delta K = \frac{dK}{dR} \Delta R \tag{1}$$

$$= -\frac{GM\Delta m}{2R^2} \Delta R \tag{2}$$

$$\Delta U = \frac{dU}{dR} \Delta R \tag{3}$$

$$= -\frac{GM\Delta m}{R^2} \Delta R \tag{4}$$

$$\frac{\Delta K}{\Delta U} = \frac{-\frac{GM\Delta m}{2R^2}\Delta R}{-\frac{GM\Delta m}{R^2}\Delta R} \quad (5)$$

$$= \frac{1}{2} \quad (6)$$

- You can use the `\begin{align}` and `\end{align}` to achieve this. Remember to include a `&` before every `=` sign so equations can be actually aligned
- Below is an example:

```
\begin{align}
\Delta U &= \frac{dU}{dR} \Delta R \\
&= -\frac{GM\Delta m}{R^2} \Delta R
\end{align}
```
- You can find more in Overleaf's website

5 Inserting Images

- 1- First, upload your images to **Overleaf**
- 2- Second, include this line:

```
– \includegraphics[scale= 1]{Preamble.png}
```
- As for how to rotate images, align images, please check out [this link](#)

6 Hyperlinks

- First include the following packages in the **preamble**

```
\usepackage{hyperref}
\hypersetup{
  colorlinks=true,
  linkcolor=blue,
  filecolor=magenta,
  urlcolor=cyan,
  pdftitle={Overleaf Example},
  pdfpagemode=FullScreen,
}
```
- Obviously, change the colours as you like
- Whenever you use hyperlink, type: `\href{Your URL}{the text}`
- Below is an example:

```
\begin{itemize}
\item Go to \href{https://www.overleaf.com/login}{the login page of Overleaf}
\item Create a New Account \footnote{You'll likely obtain a professional acco
```
- You can see the result above!

7 Footnote

- Just type down `\footnote {}`
- The formatting is automatic

8 Fonts

8.1 Bolding

- I almost always use `\textbf {}`
- There are all sorts of strange commands you can find online, and some honestly sucks
- You can read [this](#) for more details ³
-
- Below I will compare fonts from `bf`, `textbf` and `bfseries`. To be honest, to me it looks the same, but they are used in **very** different contexts
- **bf**
- **textbf**
- **bfseries**

8.2 *Italics*

- I only use `\textit`
- Below I will compare fonts from `Textit`, `itshape` and `it`. To be honest, again, to me it looks the same, but they are used in different contexts
- *textit*
- *itshape*
- *it*

8.3 *Nested Commands*

- The below are from comments in 2012, I am not sure if it's the same now
- `\it` and `\bf` do not support nesting
- `\textit` and `\textbf` supports nesting

³This thread is 11 years old already

8.4 Tables

- You can make very nice tables with L^AT_EX

Time	Activity	Remarks
7:00	Train in Glasgow /Paris	
12:00	Arriving in King's Cross Station	
12:30	Check in	
13:00-14:00	Lunch	
15:00-18:45	Hong Kong Disneyland	Walk Around
19:15-20:45	Dinner	

- You should type like this:

```
\begin{table}[H]
\begin{center}
\begin{tabular}{c|c|c}
\textbf{Time} & \textbf{Activity}&\textbf{Remarks}\\
\hline\hline
7:00 & Train in \textbf{Glasgow}/Paris & \\
\hline
12:00 & Arriving in \textbf{King's Cross Station}&\\
\hline
12:30 & Check in & \\
\hline
13:00-14:00 & Lunch & \\
\hline
15:00-18:45 & Hong Kong Disneyland & Walk Around\\
\hline
19:15-20:45 & Dinner &\\
\hline
\end{tabular}
\end{center}
\end{table}
```

- To adjust position please download `\usepackage{float}`

9 Bonus Session: Downloading PDF for TexMaker users

- I understand that most of you are Overleaf users, but this section is for TexMaker users
- Save your document as `astrophysics.tex`. Download MikTeX (The Source Code is available in GitHub), go to command prompt and `cd` to the place you stored your tex file
- Then type `pdflatex nameofyourdocument.tex`
- You can also click "View" in TexMaker, then "print" and then "Microsoft Print to Pdf". However, at least for me, the hyperlinks may be lost.

10 Conclusion

L^AT_EX is a visually stunning and user-friendly. If you have any problems, feel free to **contact me through betelgeuse0125@gmail.com or whatsapp** me