

LaTeX reference

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https://www.sharelatex.com/learn/Main_Page

1 Structure/Appearance

1.1 Types of documents

1.1.1 Article

```
\documentclass[12pt]{article}  
\documentclass[11pt]{article}  
\documentclass[10pt]{article}
```

(10pt is the default font size)

1.1.2 Report

1.1.3 Beamer

This one may or may not have its own how-to document.

1.2 Margins

1. Sides (odd- and even-numbered pages):

```
\addtolength{\oddsidemargin}{-0.875in}  
\addtolength{\evensidemargin}{-0.875in}  
\addtolength{\textwidth}{1.75in}
```

2. Top/bottom:

```
\addtolength{\topmargin}{-0.875in}  
\addtolength{\textheight}{1.75in}
```

A better way (both do the same thing; can customize the second a little more):

- `\usepackage{fullpage}`
- `\usepackage[margin=1in]{geometry}`

1.3 Line spacing and indentation

`\setlength{\parindent}{0m}` Set indent for new paragraphs `\setlength{\parskip}{0.5em}` Set spacing between paragraphs

1.4 Headers and footers

In preamble:

```
\usepackage{fancyhdr}
\pagestyle{fancy}
\lhead{text} % Top left
\rhead{text} % Top right
\chead{text} % Top center
\lfoot{text} % Bottom left
\rfoot{text} % Bottom right
\cfoot{text} % Bottom center
```

1.5 Text alignment

```
\usepackage{ragged2e}

• \begin{flushright}...\end{flushright}
• \begin{center} ... \end{center}
• \begin{justify} ... \end{justify}
```

```
\begin{center}
...
\end{center}
```

vs.

```
\centering
```

Both are *horizontal* alignments. Using `begin/end` will pad above and below with white space (like bulleted lists). Don't use it inside the figure environment.

`centering` will not pad with white space. Use braces: `{\centering text I want centered.}`

`\center` is not a thing.

1.6 Font size inside text

```
{\Large I want this text to be big.}
```

I want this text to be big.

(enclosing entire thing in `{}`s keeps from having to use `\normalsize` at the end).

```
\Huge
```

```
\huge
\Large
\large
\normalsize
\small
\footnotesize
\scriptsize
\tiny
```

1.7 Font style

```
\textbf{This text is bold}
\textit{This text is in italics}
\emph{This text is also in italics.. what's the difference??}
\underline{This text is underlined}
```

1.8 Spacing

This website is glorious:

<http://www.terminally-incoherent.com/blog/2007/09/19/latex-squeezing-the-vertical-white-space/>

- `\newpage` Jump to a new page after previous section
- `\\` new line
- `\hspace` horizontal space
- `\hspace{20 mm}` horizontal blank space equal to 20 mm
- `\vspace` vertical space
- `\noindent` self-explanatory

1.8.1 Center justify text

```
\begin{centering}
  Here is some text to go in the middle of my page, e.g. a title
\end{centering}
```

2 Sections

2.1 Nested section options

```
\section{My First Section}
\subsection{My Subsection}
\subsubsection{A subsubsection}
\paragraph{text}
\subparagraph{text}
```

Paragraphs are not numbered or followed by a line break. There appears to be no difference between `\paragraph{}` and `\textbf{}` except for some extra space after the paragraph. Note that `\paragraph{}` and `\par` are not the same thing. `\par` does the same thing as a blank line; useful if you don't want unnecessary blank space.

2.2 Referring to sections in text using section labels

See section `\S\ref{data}` for the data description.

```
...
\subsection{The Data}\label{data}
...
```

2.3 Customize sectioning in the preamble

(See § 8 for adding color to section names).

Change font size, make font bold, etc.

```
\usepackage{titlesec}
\titleformat*{\section}{\LARGE\bfseries}
\titleformat*{\subsection}{\Large\bfseries}
\titleformat*{\subsubsection}{\large\bfseries}
\titleformat*{\paragraph}{\large\bfseries}
\titleformat*{\subparagraph}{\large\bfseries}
```

(not sure what the subparagraph is.)

Use roman numerals instead of regular numbers

```
\renewcommand{\thesection}{\Roman{section}}
```

3 Figures

```
\usepackage{graphicx}
...
\begin{figure}[h]
\centering
\includegraphics[width=5.0in]{GreekSymbols.jpg}
\caption{How to insert greek symbols in LaTeX}
\label{greek}
\end{figure}
```

placement specifiers: [htbp!] ‘here’, ‘top’, ‘bottom’,...

4 Tables

```
\begin{table}[h]
\caption{Values for polytropic index  $n = 4.5$ }
\centering
\begin{tabular}{cccccccc}
\hline\hline
 $n$  &  $\xi_1$  &  $\rho_c/\rho$  &  $N_n$  &  $W_n$  &  $\Theta_n$  &  $\rho_c[g, cm^{-3}]$  &  $P_c[dyne, cm^{-2}]$  &  $T_c[K]$  \\
\hline
4.5 & 31.841 & 6187.500 & 0.658 & 4917.415 & 3.329 & 8718.704 & 5.535e19 & 4.742e7 \\
\hline
\end{tabular}
\\
```

```
\label{table:nonlin}
\end{table}
```

For the `tabular` line, `c` stands for center-justified; use `l` and `r` for left and right justified.

5 Maths!

<http://www.math.harvard.edu/texman/node17.html>

5.1 Inside text

Examples

- $\frac{1}{4} \rightarrow \frac{1}{4}$
- $G=6.67 \times 10^{-8} \rightarrow G = 6.67 \times 10^{-8}$

If text is bold, make math symbols bold as well:

```
\textbf{This article discusses the \boldmath$\beta$ parameter}
```

This article discusses the β parameter

5.2 Equations

5.2.1 Numbered equations

```
\begin{equation}
P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}
\end{equation}
```

$$P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}} \quad (1)$$

INCLUDE LABELING AND REFERENCING HERE!

5.2.2 Equations without numbering

Note that the `\boxed{...}` commands are putting the examples in boxes, but are not necessary for writing equations.

```
\begin{equation*}
\boxed{
P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}
}
\end{equation*}
```

$$P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}$$

Or simply put double `$$`s on each side of equation:

\$\$ P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}} \$\$

$$P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}$$

This may not work for more complicated math, such as matrices.

5.2.3 Aligning equations

```
\usepackage{amsmath}
...
\begin{align}
k_1 &= hf(x_n, y_n) \\
k_2 &= hf(x_n + \frac{1}{2}h, y_n + \frac{1}{2}k_1) \\
k_3 &= hf(x_n + \frac{1}{2}h, y_n + \frac{1}{2}k_2) \\
k_4 &= hf(x_n + h, y_n + k_3) \\
y_{n+1} &= y_n + \frac{1}{6}k_1 + \frac{1}{3}k_2 + \frac{1}{3}k_3 + \frac{1}{6}k_4 + O(h^5) \\
\end{align}
```

$$k_1 = hf(x_n, y_n) \tag{2}$$

$$k_2 = hf(x_n + \frac{1}{2}h, y_n + \frac{1}{2}k_1) \tag{3}$$

$$k_3 = hf(x_n + \frac{1}{2}h, y_n + \frac{1}{2}k_2) \tag{4}$$

$$k_4 = hf(x_n + h, y_n + k_3) \tag{5}$$

$$y_{n+1} = y_n + \frac{1}{6}k_1 + \frac{1}{3}k_2 + \frac{1}{3}k_3 + \frac{1}{6}k_4 + O(h^5) \tag{6}$$

$$\tag{7}$$

Can also remove numbering from aligned equations:

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

5.3 Size of brackets, parentheses, etc.

In order of increasing size:

```
\big( ... \big)
\Big( ... \Big)
\bigg( ... \bigg)
\Bigg( ... \Bigg)
```

BETTER:

```
\left( ... \right)
```

to scale size of brackets to what is inside them!

5.4 Operations

5.4.1 Integrals

`\int` % indefinite integral

`\int_{x1}^{x2}` % definite integral, between x1 and x2

5.4.2 Square root

`\sqrt{2\ln(2)}`

5.4.3 Summation (and the multiplication version)

`\sum_{n=1}^{\infty} 2^{-n} = 1`

$$\sum_{n=1}^{\infty} 2^{-n} = 1$$

`\$ P(D|M) \propto \prod_{i=0}^{N-1} \left\{ \exp \left[-\frac{1}{2} \left[\frac{y_i - y(x_i|a_j)}{\sigma} \right]^2 \right] \Delta y \right\}`

$$P(D|M) \propto \prod_{i=0}^{N-1} \left\{ \exp \left[-\frac{1}{2} \left[\frac{y_i - y(x_i|a_j)}{\sigma} \right]^2 \right] \Delta y \right\}$$

6 Symbols

```
\AA{}    % Angstrom (does not go in between $s)
\infty   % infinity
\sim     % '~'
\approx  % 'double ~'
\propto  % proportionality symbol (like alpha)
\equiv   % like '=', but with three lines.
& \%    % include these symbols in document
        % (also precede a space with '\ ' when in math mode).
\pm      % plus or minus (\mp for minus or plus)
```

some text

7 Itemized Lists

7.0.4 Adjust spacing between items

In preamble:

```
\usepackage{enumitem}
\setlist[1]{itemsep=-2pt}
```

Within text: no space between items, no space between text and list. (Can also add this to `\setlist` in preamble to apply globally).

```
\begin{itemize}[noitemsep,topsep=0pt]
```

No space between items:

```
\usepackage{mdwlist}
...
\begin{itemize*}
  \item ...
\end{itemize*}
```

7.0.5 Numbering

1.1, 1.2 \rightarrow 1.2.1, 1.2.2, etc

```
\usepackage{enumitem}
...
\begin{enumerate}[label*=\arabic*.] % ???
\begin{enumerate}[I] % roman numerals
\begin{enumerate}[I.] % roman numerals followed by a period
\begin{enumerate}[(a)] % you get the idea...
```

To go from section numbering 0.0.1 to just 1, put this in the preamble (copied from internet, but not actually sure how this works).

```
\usepackage{titlesec}
```



```

\titleformat{\section}%
  [hang]% <shape>
  {\normalfont\bfseries\Large}% <format>
  {}% <label>
  {0pt}% <sep>
  {}% <before code>
\renewcommand{\thesection}{}% Remove section references...
\renewcommand{\thesubsection}{\arabic{subsection}}%...from subsections
\renewcommand{\thesubsubsection}{\arabic{subsubsection}}%...from subsections
\begin{document}
...

```

8 Color

`\usepackage{color}` is required for pre-defined colors (white, black, red, green, blue, cyan, magenta, yellow)

`\usepackage{xcolors}` is needed to define new colors (see SS ??).

8.1 Color section names

In Preamble:

```

\usepackage{sectsty}
\sectionfont{\color{blue}}
\subsectionfont{\color{blue}}
\subsubsectionfont{\color{blue}}

```

8.2 Color background

```

\usepackage{xcolor}
\pagecolor{yellow!30}

```

8.3 Color text

```

\usepackage{color}
...
\textcolor{red}{I want the text in the brackets to be red.}

```

8.4 Define your own colors!

<http://latexcolor.com>

```

\usepackage[usenames, dvipsnames]{color}
\definecolor{mypink1}{rgb}{0.858, 0.188, 0.478}
\definecolor{mypink2}{RGB}{219, 48, 122}
\definecolor{mypink3}{cmymk}{0, 0.7808, 0.4429, 0.1412}
\definecolor{mygray}{gray}{0.6}
\textcolor{mygray}{text I want to be gray}.

```

9 Hyperlinks

Insert hyperlink:

```
\url{http://google.com}  
\href{http://google.com}{link text}  
\href{http://google.com}{\textcolor{blue}{link text}}
```

For more information, visit [this link](#).

10 Putting text in a box

```
\usepackage{xcolor}  
\usepackage{lipsum}  
\begin{document}  
\lipsum[1]  
\medskip  
\noindent\fcolorbox{red}{yellow}{%  
  \minipage[t]{\dimexpr0.48\linewidth-2\fbboxsep-2\fbboxrule\relax}  
    \lipsum[2]  
  \endminipage}\hfill  
  \fcolorbox{red}{yellow}{%  
    \minipage[t]{\dimexpr0.48\linewidth-2\fbboxsep-2\fbboxrule\relax}  
      \lipsum[3]  
    \endminipage}  
\medskip  
\lipsum[4]
```

Notes: You can adjust the thickness of border and padding of `\fcolorbox{<border-color>}{<background-color>}{<contents>}` by setting `\fbboxrule=<value><unit>` and `\fbboxsep=<value><unit>`, respectively. Put the setting before invoking `\fcolorbox{<border-color>}{<background-color>}{<contents>}`. For example: `\fbboxrule=1pt` and `\fbboxsep=5pt`. Use `t`, `c`, `b` options to align the base line of the most top row, the center row and the most bottom row with the surrounding baseline.

11 Bibliographies

```
\bibliographystyle{plain}  
\begin{document}  
... \cite{id} ...  
\bibliography{reffile}  
\end{document}
```

11.1 Creating and using a makefile

```
cl> vi reffile.bib  
  @ARTICLE{label_name,  
    title={},  
    journal={},  
    ...  
  }  
cl> vi makefile
```

```
my_paper: paper.tex
pdflatex paper
bibtex paper
pdflatex paper
pdflatex paper
cl> make my_paper
```

12 Columns

```
\begin{minipage}[t]{0.2\textwidth}
  stuff
\end{minipage}
\begin{minipage}[t]{0.8\textwidth}
  longer stuff
\end{minipage}
```

13 Misc

13.1 Tips

To squelch that stupid warning about “possible unwanted white space”, add a % sign after the opening bracket:

```
{%
  blah blah blah
}
```

13.2 Create your own command!

```
\newcommand{\bla}{blah blah blah}
```

13.3 Verbatim

verb is used “in line”, while verbatim makes a display. E.g.

```
\begin{verbatim}
cl> git status
cl> git add -A
cl> git commit -m "commit message"
end{verbatim}
```

(“endverbatim” is also preceded with a backslash, but there were difficulties in printing it out in this document).

```
cl> git status
cl> git add -A
cl> git commit -m "commit message"
```

Or do:

Define a document class like this: `\verb|\documentclass{article}|`

Define a document class like this: `\documentclass{article}`