LaTeX reference

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- https://www.sharelatex.com/learn/Main_Page
- http://texdoc.net/texmf-dist/doc/latex/lshort-english/lshort.pdf
- http://texdoc.net/texmf-dist/doc/latex/titlesec/titlesec.pdf

Contents

1   Units

`px` pixels, depends on browser, use for electronic media

`pt` points, use in print media

`em` *Horizontal* size, 1em is equal to the font size of the text.

`ex` *Vertical* size, 1ex is equal to the height of the letter 'x' in the relevant font (usually).

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}`

3 Line spacing and indentation

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

In preamble:

`\setlength{\parindent}{0m}` Set indent for new paragraphs

`\setlength{\parskip}{0.5em}` Set spacing between paragraphs

In body:

- `\newpage` Jump to a new page after previous section
- `\\` Force line break
- `\hspace` horizontal space
- `\hspace{20 mm}` horizontal blank space equal to 20 mm
- `\hfill` Pad with horizontal space to end of line
- `\vspace` vertical space
- `\noindent` self-explanatory
- `\begin{samepage}... \end{samepage}` Keep something from being split by a page break.

4 Headers and footers

In preamble:

```
\usepackage{fancyhdr}
\pagestyle{fancy}
\setlength{\headheight}{15pt}
\lhead{text} % Top left
\rhead{text} % Top right
\chead{text} % Top center
\lfoot{text} % Bottom left
\rfoot{text} % Bottom right
\cfoot{text} % Bottom center
```

The `\headheight` option sets the amount of space between the header and the top edge of the paper. Value has to be greater than 13.6, otherwise will get an error message. Document still compiles, but better safe than sorry.

5 Text alignment

5.1 Horizontal alignment

```
\usepackage{ragged2e}
```

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

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

vs.

```
\centering
```

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.

5.2 Vertical alignment

`[ctb]` Options like this will center at top, center, bottom, etc.

6   Font

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

(10pt is the default font size)

6.1   Font style

```
\textbf{This text is bold}
{\bf this text is also bold}
\textit{This text is in italics, for quotes or titles}
{\it This text is also in italics, for quotes or titles}
\emph{This text is also in italics, for emphasis}
\underline{This text is underlined}
\texttt{This text is computer style}
\textsf{sans serif}
\textsl{slanted (slightly different from italics}
\textsc{Small caps}
```

6.2   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
```

7   Sections

7.1 Nested section options

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

(not sure what the subparagraph is.) 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.

7.2 Customize sectioning in the preamble

(See § 10 for adding color to section names). Need to move coloring for sections here. Organize things by the item itself (sections, lists, etc.), not by what is being done (coloring, sizing, etc.)

Change font size, make font bold, etc.

```
\usepackage{titlesec}
\titleformat*{\section}{\LARGE\bfseries}
```

Do this with any of the nested sections.

Add word (s) in front of section number

```
\renewcommand{\thesection}{Text \arabic{section}}
```

Use roman numerals instead of regular numbers

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

Other

```
\setcounter{secnumdepth}{0}
```

7.3 Referring to sections in text using section labels

```
See section $\S$\ref{data} for the data description.
...
\subsection{The Data}\label{data}
...
```

8 Table of contents

`\tableofcontents` wherever you want it to go. You will have to run `pdflatex` twice.

In preamble: `\setcounter{tocdepth}{n}` where `n` is the number of levels deep to go, e.g. 1: sections, 2: sections and subsections, etc.

Some sections, like those with '*' won't be included. To add them: Syntax: `\addcontentsline{type}{section_level}{entry}` Example: `\addcontentsline{toc}{section}{Preface}`

To change space between items in toc:

```
\usepackage{setspace}
...
\begin{document}
\addtocontents{toc}{\protect\setstretch{n}}
```

where n is between 0 and 1? Set to fraction of default? What does "protect" do?

Include figures and tables:

```
\listoffigures
\listoftables
```

Note that the figure and table environments need to be used.

Two columns:

```
\usepackage[toc]{multitoc}
\renewcommand*{\multicolumntoc}{2} # but 2 is the default...?
\setlength{\columnseprule}{0.5pt}
```

9 Lists

- ftp://ftp.nsu.ru/mirrors/ftp.dante.de/tex-archive/macros/latex/contrib/enumitem/enumitem.pdf
- https://www.ntg.nl/maps/11/33.pdf
- https://www.sharelatex.com/learn/Lists#Reference_guide
- http://ctan.mirrors.hoobly.com/macros/latex/contrib/enumitem/enumitem.pdf
- http://www.troubleshooters.com/linux/lyx/ownlists.htm

New stuff:

```
\setlist[enumerate]{font={\bfseries}}% global settings, for all lists
\setlist[enumerate,1]{label={(\arabic*)}}
\setlist[enumerate,1]{label={(\roman*)}}
```

In preamble:

7

```
\usepackage{enumitem}
\setlist[<typeoflist>,<n>]{<options>}
```

typeoflist can be itemize, enumerate, description, etc. **n** is the nested level (1 for top level). Options are as follows:

Horizontal spacing

rightmargin Change right margin of description text.

leftmargin Distance from the left edge of the current environment to the left margin of the item label. Remember, environments can nest. Defaults to 0.

listparindent The indent of the first line of each paragraph in an item, except for the first paragraph of an item. If you're pressed for vertical space and want to decrease interparagraph spacing within items while still giving the user cues as where new paragraphs begin, this is the way to do it.

labelwidth Width allotted to the label. This should be equal to or greater than the longest *expected* label. Good for lining up text when labels are left-aligned.

labelsep The distance between the rightmost part of the label (assuming you haven't changed the label from its default right justification) to the left margin of the item body. This is one of the handiest adjustments you can make to create the ultimately readable list for your exact situation. Use it early and often.

BEWARE: This setting enforces this distance by shoving the label left rather than moving the body left margin right. If you set this you might need to add a corresponding amount to **leftmargin**, if you want your labels in a specific place. Space between label and following text

itemindent Only indents the first line (with the label) This length is capable of causing some real ugliness – leave it alone unless you have a really good reason not to. What this horrid adjustment does is takes the label and first line of a multiline body, and push them left from the normal item body left margin. This makes the body lines not line up. It's ugly. If you already have a list where multiline items look wrong, try setting this length to 0 to see whether a previous global setting of this length has caused problems.

Don't set this length except out of self-defense. It's trouble.

Vertical spacing

parskip Space between paragraphs outside of a list, and part of the space between a non-list paragraph and a list item. This is NOT a list property; it can be set globally for entire documen (see SS ref{}).

topsep Extra space added to `parskip` before the first AND after the last item.

parsep Paragraph separation within a single item.

itemsep Extra inter-item spacing added to `parsep`

partopsep This is added to the top and/or bottom of the list if and only if there's a blank line above or below the first or last item. *Leave this alone unless blank lines become a problem.*

```
leftmargin=*        % Align with main text
font=\normalfont    % Not bold, which is the default
style=nextline      % For when text is too long?
style=multiline     % ???
```

To customize the description labels (the items inside the square brackets), in the preamble:

```
\renewcommand{\descriptionlabel}[1]{%
    \hspace{\labelsep}
    \ttfamily
    \textcolor{red}{#1}
}
```

This puts the labels in typewriter font in a different color. By default, description labels start a distance equal to `hspace` to the *left* of the text, so adding that line causes them to line up with the left edge of the text instead.

Alternative way to get red of the space between items (without `enumitem` package):

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

\up{tasks} ???
...
\begin{tasks}(4)
    \task one
    \tast two
\end{tasks}
```

These will be listed horizontally, rather than vertically.

```
\begin{list}{}
    ...
\end{list}
```

Brackets by list will set the style; leave this empty for no symbols

9.1   Numbering

1.1, 1.2 → 1.2.1,1.2.2, etc

```
\usepackage{enumitem}
...
\begin{enumerate}[label*=\arabic*.] % ???
\begin{enumerate}[I] % roman numerals
\begin{enumerate}[I.] % roman numberals 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}
...
```

10   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 **??**).

10.1   Color section names

In Preamble:

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

10.2   Color background

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

10.3   Color text

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

10.4   Define your own colors

http://latexcolor.com

```
\usepackage[usenames, dvipsnames]{color}
 \definecolor{color}{HTML}{AF00D7} % HTML must be in caps!
 \definecolor{mypink1}{rgb}{0.858, 0.188, 0.478}
 \definecolor{mypink2}{RGB}{219, 48, 122}
 \definecolor{mypink3}{cmyk}{0, 0.7808, 0.4429, 0.1412}
 \definecolor{mygray}{gray}{0.6}
\textcolor{mygray}{text I want to be gray}.
```

11   Hyperlinks

In preamble:

```
\usepackage{hyperref}
\hypersetup{colorlinks=true,
    urlcolor=darkpowderblue,
    linkcolor=black
}
\urlstyle{same}
```

This globally sets the color of urls and links (such as the table of contents), and makes the font of urls the same as that of the rest of the text.

Insert hyperlink:

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

to manually change the color of one url.

```
For more information, visit \href{http://google.com}{\textcolor{blue}{this link}}.
```

For more information, visit [this link](http://google.com).

12   Putting text in a box

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


\colorbox{hl}{\parbox{0.9\textwidth}
text to go in box}
```

For last example, 'hl' is the highlight color, or background color of the box. The parbox is the box that contains the text itself, here set to be not quite as wide as the body text.

Notes: You can adjust the thickness of border and padding of \fcolorbox{<border-color>}{<background-colo by setting \fboxrule=<value><unit> and \fboxsep=<value><unit>, respectively.
Put the setting before invoking \fcolorbox{<border-color>}{<background-color>}{<contents>}.
For example: \fboxrule=1pt and \fboxsep=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.

13 Columns

```
\begin{columns}
    \column{0.5\textwidth}
    content goes here
    \column{0.5\textwidth}
    more content here
\end{columns}

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

\addtolength{\columnsep}{5mm} add space between columns.
```
Not sure what the difference is between columns and minipages.

14 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',...

15 Tables

```
\begin{table}[h]
\caption{Values for polytropic index $n$ = 4.5}
\centering
\begin{tabular}{ c c c c c c c c c  }
 \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.

16   Bibliographies

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

16.1   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
```

17   Maths!

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

17.1   Inside text

Examples

- $\frac{1}{4}$ → $\frac{1}{4}$
- $G=6.67\times10^{-8}$ → $G = 6.67 \times 10^{-8}$

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

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

This article discusses the $\boldsymbol{\beta}$ parameter

17.2 Equations

17.2.1 Numbered equations

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

$$\boxed{P_{\text{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}} \tag{1}$$

INCLUDE LABELING AND REFERENCING HERE!

17.2.2 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_{\textrm{mag}} = \frac{B^2}{\sqrt{4\pi\rho_o}}
    }
\end{equation*}

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

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

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

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

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

17.2.3 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*}
```

17.3   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!

Increase size of fraction inside text:

```
\cfrac{1}{2}
```

There are $\frac{1}{2}$ as many as there were.

There are $\dfrac{1}{2}$ as many as there were.

17.4   Operations

17.4.1   Integrals

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

17.4.2   Square root

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

17.4.3   Summation (and the multiplication version)

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

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

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

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

18   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

19   Misc

19.1   Tips

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

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

19.2   Create your own command!

Syntax: \newcommand{<cmd>}[<n>][<opt>]{<stuff>}

n	Number of arguments
opt	Options
stuff	stuff

19.3   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}

20   Questions and things to be added

This may be required for a dissertation :(

```
\usepackage[doublespacing]{setspace}
```

Could make a new environment using \tt for stuff that doesn't apply to latex itself. . .

In think_python.tex, add part for using straight single quotes in verbatim environment.

What's the difference between \clearpage and \newpage?

What does the '*' do in the titleformat part of preamble?

How to condense the toc, make singlespaced, not bold, keep multiple columns from overlapping, etc.