Introduction to LaTeX

1 How it works

LaTeX is the standard mathematical typesetting program. The way it works is you type commands and text into a text file, compile it with LaTeX, and a pdf (or ps or dvi) file will be created that contains the final typeset document. Technically, you can use any text editor to write your LaTeX code, however, LaTeX specific editors and GUIs are great because they let you use standard toolbars, rather than command-lines, and text is easily color-coded to show comments vs. text vs. commands.

```
\documentclass[12pt]{article}
\usepackage{amsmath}
\title{\LaTeX}
\date{}
\begin{document}
  \maketitle
  \LaTeX{} is a document preparation system for the \TeX{}
  typesetting program. It offers programmable desktop
  publishing features and extensive facilities for
  automating most aspects of typesetting and desktop
  publishing, including numbering and cross-referencing,
  tables and figures, page layout, bibliographies, and
  much more. \LaTeX{} was originally written in 1984 by
  Leslie Lamport and has become the dominant method for
  using \TeX; few people write in plain \TeX{} anymore.
  The current version is \LaTeXe.

  % This is a comment, not shown in final output.
  % The following shows typesetting power of LaTeX:
  \begin{align}
    E_0 &= mc^2                                  \\
    E &= \frac{mc^2}{\sqrt{1-\frac{v^2}{c^2}}}
  \end{align}
\end{document}
```

LaTeX

LaTeX is a document preparation system for the TeX typesetting program. It offers programmable desktop publishing features and extensive facilities for automating most aspects of typesetting and desktop publishing, including numbering and cross-referencing, tables and figures, page layout, bibliographies, and much more. LaTeX was originally written in 1984 by Leslie Lamport and has become the dominant method for using TeX; few people write in plain TeX anymore. The current version is LaTeX 2_ε.

$$E_0 = mc^2 \tag{1}$$

$$E = \frac{mc^2}{\sqrt{1-\frac{v^2}{c^2}}} \tag{2}$$

2 Where to get LaTeX

Mac OSX

The complete MacTeX package is recommended if you think you will use MacTeX in the future. It is over 1GB in size, so if space is severely limited on your computer, you can download the small package for beginners. However, download the full version if you have the space as the smaller version requires multiple downloads to ensure you have everything that you need.

MacTeX:

Full Version: http://www.tug.org/mactex/

Small Version: http://www.tug.org/mactex/morepackages.html

Once installed, you will use the editor called TeXShop.

MacTeX also comes with LaTeXiT - a great piece of software for putting equations into PowerPoint or Keynote slides.

Windows

From what I can tell, proTeXt appears to be recommended.

proTeXt:

http://www.tug.org/protext/

Once installed, you will can the editor called TeXstudio.

MiKTeX, TeX Live

MiKTeX: http://miktex.org/download

TeX Live: http://www.tug.org/texlive/

Both MiKTeX and TeX Live include the editor TeXworks which you can use to edit, run and view your latex documents.

Linux or Unix

LaTeX is probably already on your system along with an editor. Check with your admin before downloading anything.

3 Initial Setup

I have provided a template to get you started with LaTeX, called *latex_template.tex* (on the course website). To run the code, just find the "Typeset" command in your editor. For TeXShop, it is a button in the upper-left corner of the page you are typing in. A pdf should be created of the final typeset document. Save the template, and then edit versions of it to fit your specific needs.

4 Getting Help

The learning curve for LaTeX is steep, however, because it is so widely used there are thousands of "beginner's guides" to be found on the internet. For example:

Command References (e.g.)

http://www.stdout.org/~winston/latex/latexsheet.pdf (really great reference for printing)

http://en.wikipedia.org/wiki/LaTeX

http://www.artofproblemsolving.com/Wiki/index.php/LaTeX:Symbols

http://en.wikibooks.org/wiki/{\LaTeX}

Beginner's Guides (e.g.)

http://users.dickinson.edu/~richesod/latex/latexcheatsheet.pdf (this one is a favorite)

http://pctex.com/manuals/lqsSample.pdf

http://www.atmospheric-chemistry-and-physics.net/getting_started_with_latex.pdf

http://www.cs.rhul.ac.uk/~adrian/typesetting/handout.pdf

http://www.cs.princeton.edu/courses/archive/spr10/cos433/Latex/latex-guide.pdf

http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-1.pdf

http://www.maths.adelaide.edu.au/anthony.roberts/LaTeX/ltxqstart.php

Remember, you will never (and should not try to) memorize all of the specific LaTeX commands. Rather, you will remember the few you use often, and you will use Google the rest of the time.

5 Writing, submitting and publishing with LaTeX

These days, most journals offer a LaTeX template to write and submit your manuscripts. I have listed a few below:

- AGU Journals (e.g. GRL, JGR, WRR):
  - http://publications.agu.org/author-resource-center/author-guide/text-requirements/latex-formatting-toolkit/
  - http://publications.agu.org/files/2013/08/AGU-LaTeX.zip
- AMS Journals (e.g. JAS, JCLI):
  - http://www2.ametsoc.org/ams/index.cfm/publications/authors/journal-and-bams-authors/author-resources/journal-manuscript-templates/
  - http://www2.ametsoc.org/ams/index.cfm/linkservid/05278D96-953E-4D33-B200527EC2F5E743/showMeta/0/
- Copernicus Journals (e.g. ACP):
  - http://www.atmospheric-chemistry-and-physics.net/submission/latex_instructions.html
  - http://publications.agu.org/files/2013/08/AGU-LaTeX.zip