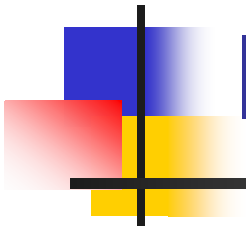
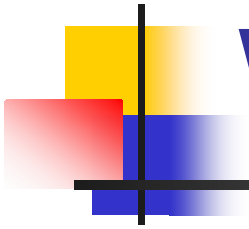


Intro to LaTeX

LaTex

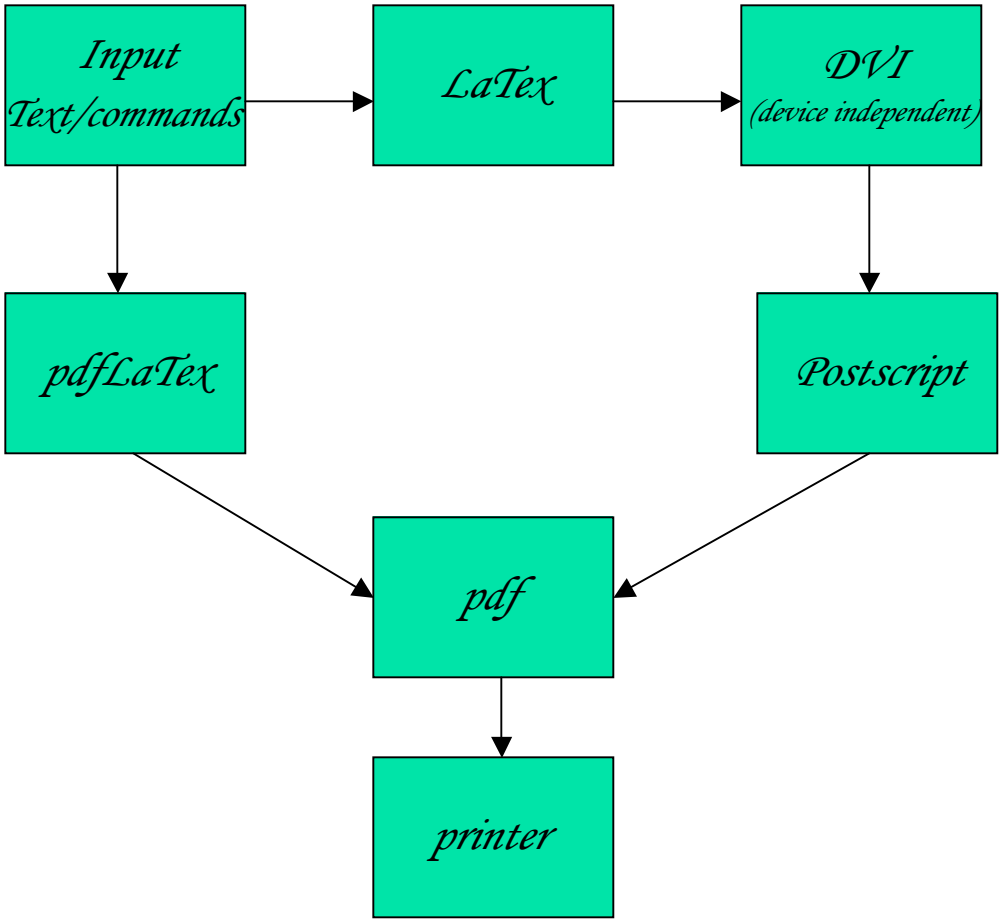
A high quality document preparation system



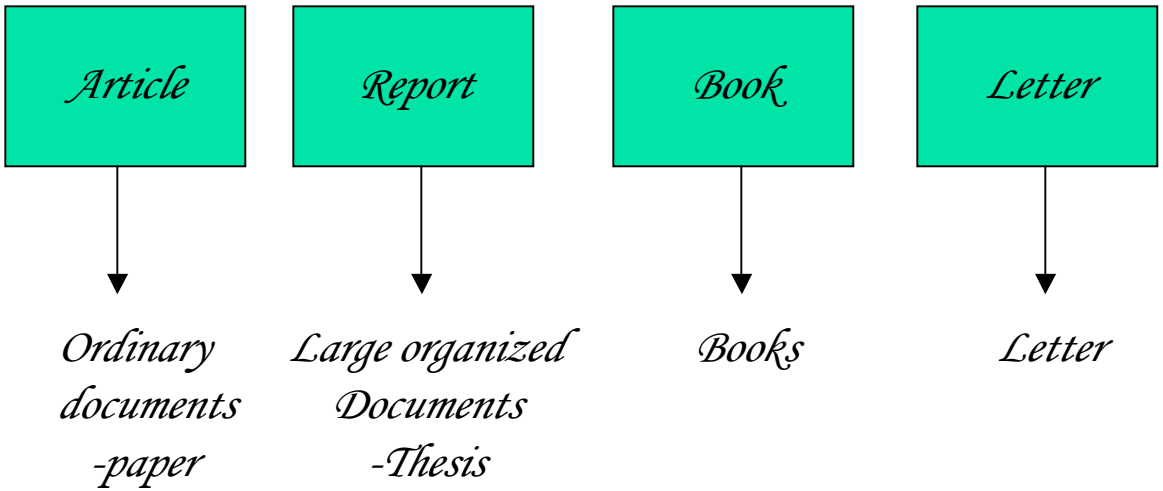
What is LaTeX

- Markup language for documents
  - You write. LaTeX typesets
- LaTeX compiles your document
  - Each letter/word/sentence/paragraph is a box. LaTeX arranges the boxes.
  - Commands and environments instruct LaTeX to change layout
- LaTeX is case sensitive

Running LaTeX: *LaTex Production Chain*



Running LaTeX: *LaTex Classes*



Example Document [381.tex]

Sets doc. type — \documentclass{article} — class type

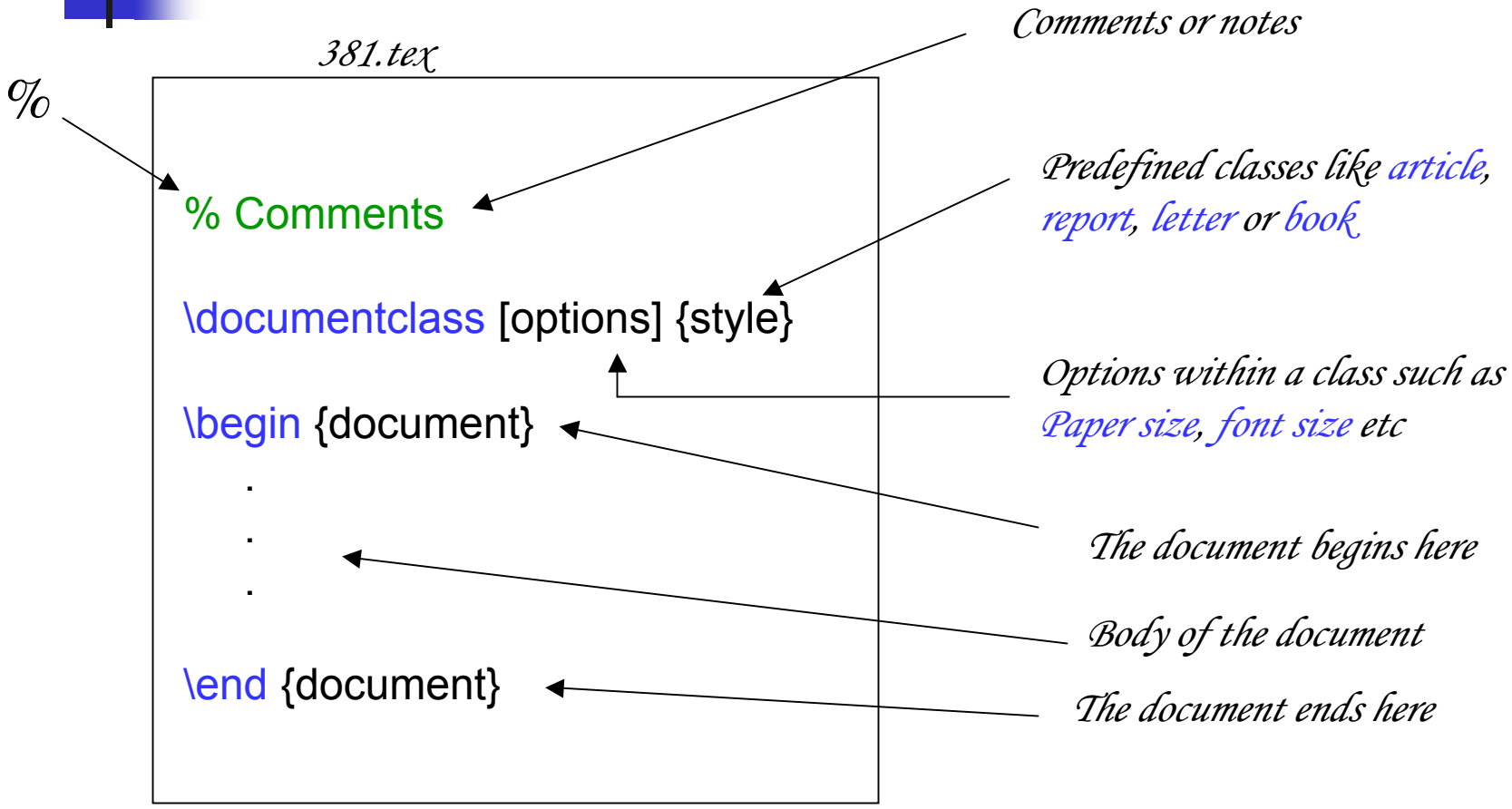
preamble

```
% comments in LaTeX start with a %.  anything after it is ignored.
% this section is the preamble..

\begin{document}
```

body

```
This is the first paragraph.
For \LaTeX, a paragraph is a continuous sequence
of lines, ending with a blank line.  This means
you    can  put
one     word
per
line
if you wish  and \LaTeX{}  will treat the text as one paragraph.

This is the second paragraph.  Just put in here to show how
paragraphs separate.

\end{document}
```

Writing a document in Latex



Sectioning Examples

\section{Top Level Section}

1 Top Level Section

\subsection{2nd Level Section}

1.1 2nd Level Section

% second \subsection not shown

\subsubsection{3rd Level Section}

1.2.1 3rd Level Section

\paragraph{Paragraph.}

Paragraph.

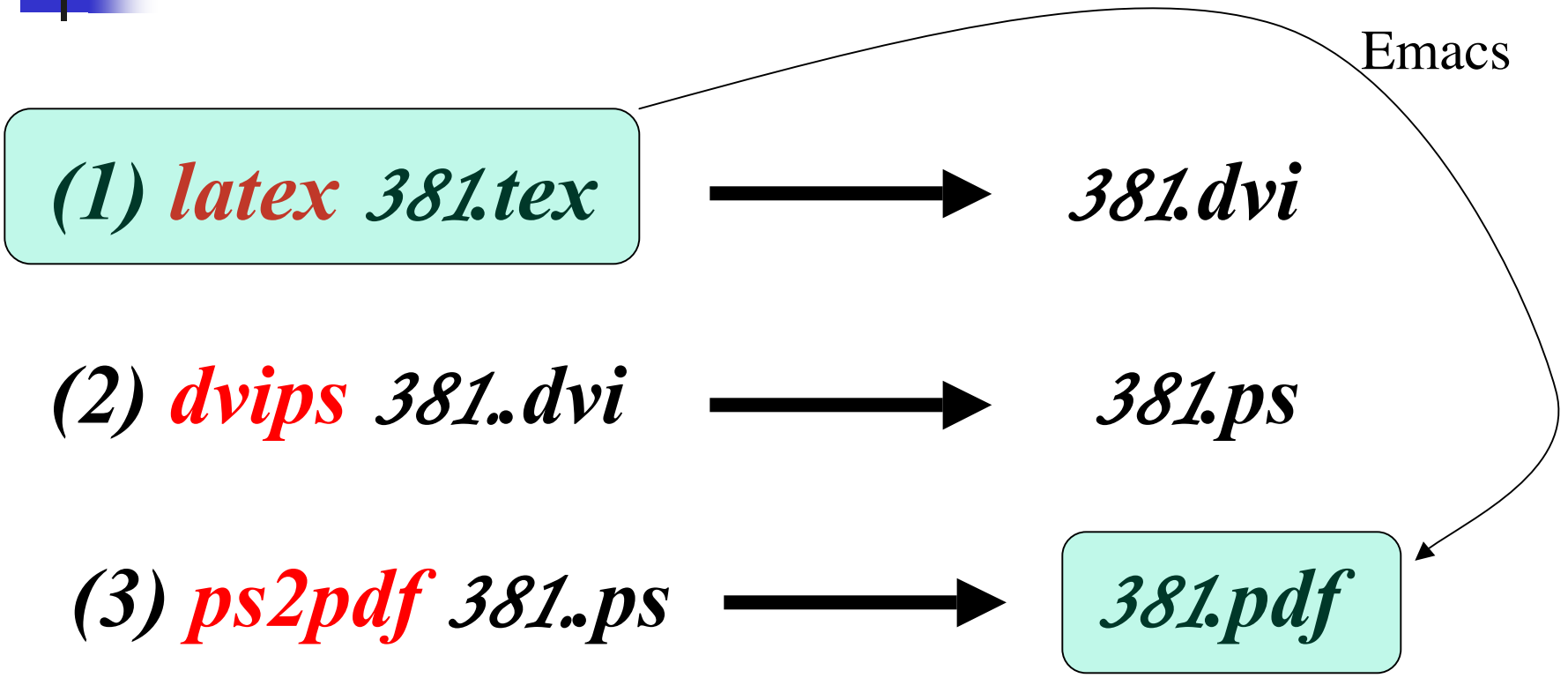
Writing a document in Latex

381.tex

```
% This is an example.tex

\documentclass {article}

\begin {document}

This is a test

\end {document}
```

This is a test

Creating the PDF file



Title, author

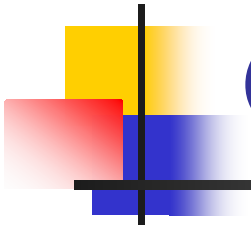
```
% This is an example.tex

\documentclass [12pt]{article}

\begin {document}

\title {This is an example}
\author {James Bond}
\maketitle

\end {document}
```

This is an example

James Bond

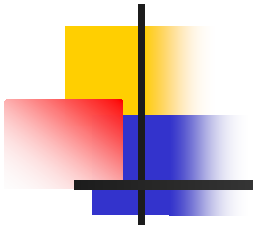
September 19, 2005

This is a test



Give it a try!

```
\documentclass{article}
\title{Phys 381 with Prof. Ouyed}
\author{Your name}
\date{January 2012}
\begin{document}
\maketitle
Hello world!
\end{document}
```



EQUATIONS

FIGURES

TABLES

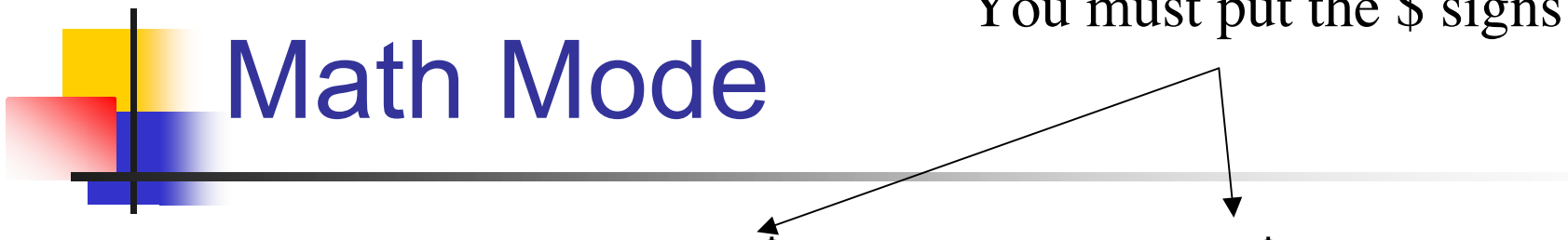
Environments

- Affects all text within env
- Conveniently hides tons of commands
- Format:

```
\begin{name}[opts]{args}
    % text...
\end{name}
```

(equation, figure, table ..)

Math Mode



- In ***normal text***, $*math formula*$
- In displayed math mode,

```
\begin{displaymath}
        math formula
\end{dispalymath}

\begin{equation}
        math formula
\end{equation}
```

  - Equation adds an equation number in ()

Math Examples (text mode)

- superscripts (^) -- x^2 + y^2 → $x^2 + y^2$
- subscript (_) -- x_i + y_i → $x_i + y_i$
- \sqrt{x^2_i + y_i^2} → $\sqrt{x_i^2 + y_i^2}$
- \frac{x}{y} → $\frac{x}{y}$
- Greek letters -- \alpha, \beta, \pi, \Pi,
- \sum_{i=0}^n i

  (different in display mode) → $\sum_{i=0}^{n} i$

Writing a document in Latex

Equations

Example.tex

```
\documentclass [12pt]{article}
\begin {document}
\title {This is an example}
\author {James Bond}
\maketitle
\section {Introduction}
\begin {equation}
g_{ \gamma_{n}}(t) =
\frac{1}{ \sqrt{s_{n}}}\;g(\frac{t-p_{n}}{s_{n}})\,\exp\left\{j(2\pi f_{n}t+\phi_{n})\right\},
\label {eq1}
\end {equation}
\end {document}
```

September 19, 2005

1 Introduction

$$g_{\gamma_n}(t) = \frac{1}{\sqrt{s_n}}\, g(\frac{t-p_n}{s_n})\, \exp\{j(2\pi f_n t + \phi_n)\}\,, \qquad (1)$$

Writing a document in Latex

Equations

Example.tex

```
\documentclass [12pt]{article}
\begin {document}
\title {This is an example}
\author {James Bond}
\maketitle
\section {Introduction}
\begin {equation}
g_{ \gamma_{n}}(t) =
\frac{1}{ \sqrt{s_{n}}}\;g(\frac{t-p_{n}}{s_{n}})\,\exp\left\{j(2\pi f_{n}t+\phi_{n})\right\},
\label {eq1}
\end {equation}
\end {document}
```

Math commands

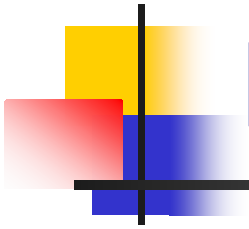
S_n - subscript

S^n - superscript

September 19, 2005

1 Introduction

$$g_{\gamma_n}(t) = \frac{1}{\sqrt{s_n}}\, g(\frac{t-p_n}{s_n})\, \exp\{j(2\pi f_n t + \phi_n)\}\,, \qquad (1)$$



Floating Environments

- Certain environments can “float”
  - Do not appear exactly where you put them
  - LaTeX moves them for better placement
  - Can be frustrating if LaTeX picks bad spot
- Tables/Figures are most common

Tabular

- Columns
  - `\begin{tabular}{|...|...|}`
  - `\end{tabular}`
- Rows
  - `&` - Split text into columns
  - `\\` - End a row
  - `\hline` - Draw line under row
  - e.g. `123123 & 34.00\\ \hline`

Two Columns

l = automatically adjust size, left justify
r = automatically adjust size, right justify
p = set size
e.g p{4.7cm}
c = centre text

Example of table

```
\begin{tabular}{|l|r|c|} \hline
Date & Price & Size \\ \hline
Yesterday & 5 & big \\ \hline
Today & 3 & small \\ \hline
\end{tabular}
```

Date	Price	Size
Yesterday	5	Big
Today	3	Small

Another example

Table

```
% This is an example.tex

\documentclass [12pt]{article}
\usepackage {epsfig, graphicx}
\begin {document}

\begin {table}
        \centering
        \begin {tabular}{|c|c|c|c|c|} \hline
Method &Groups  & Normal & Abnormal & Total \\ \hline

 LR  & Normal & 40 & 11 & 51\\
     & Abnormal & 17 & 22 & 39 \\\hline
 \%  & Normal & \bf{78.4} & 21.6 & 100 \\
     & Abnormal & 43.6 & \bf {56.4} & 100 \\\hline
        \end {tabular}
        \caption {Sample Table}
        \label {tab1}
\end {table}
\end {document}
```

Method	Groups	Normal	Abnormal	Total
LR	Normal	40	11	51
	Abnormal	17	22	39
%	Normal	**78.4**	21.6	100
	Abnormal	43.6	**56.4**	100

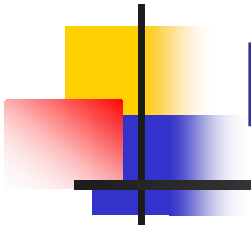
Table 1: Sample Table

FIGURES / Syntax

- Example:

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}
…
\includegraphics[width = 4in]{file.eps}
…
\end{document}
```

[angle=90,height=…]



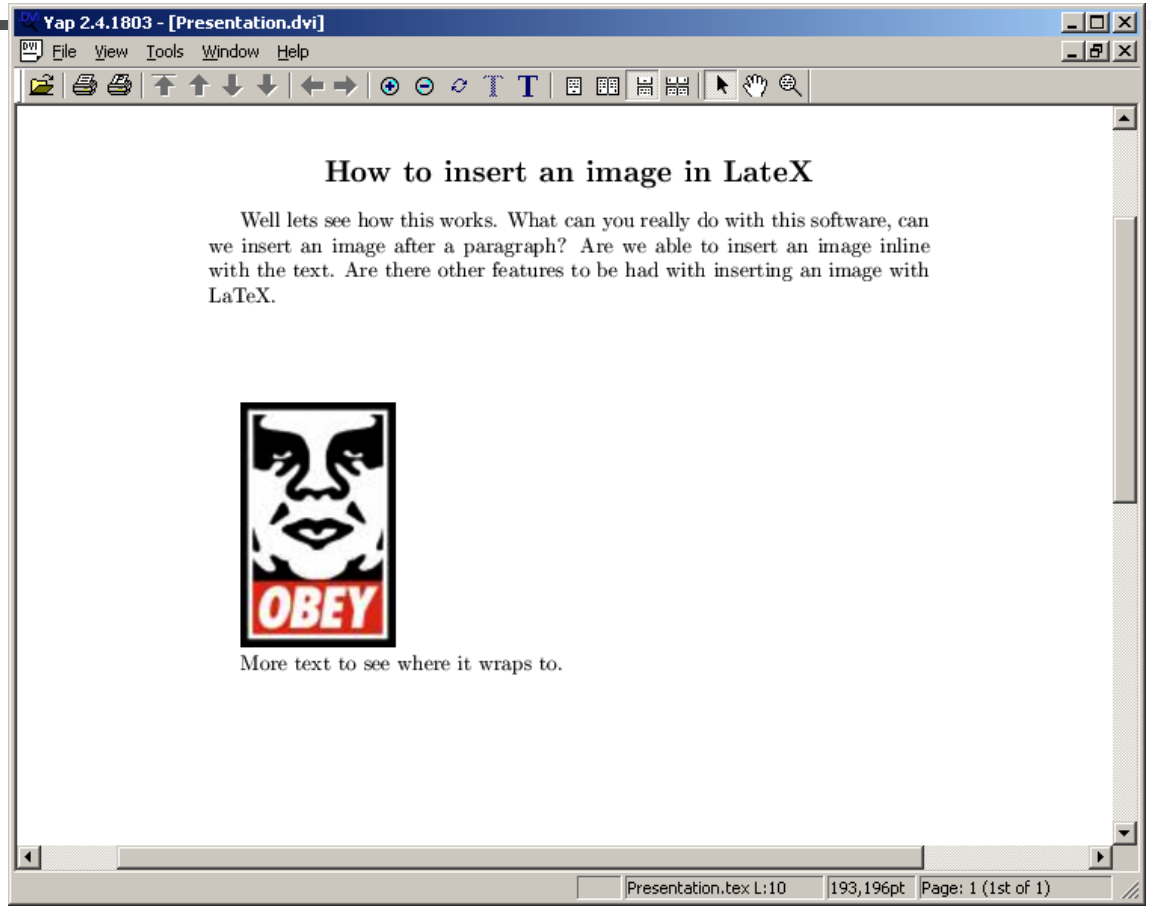
Example

- \documentclass{article}
- **\usepackage{graphicx}**
- \begin{document}

- \begin{figure}
- **\includegraphics[]{phys381-image.pdf}**
- \end{figure}
- More text to see where it wraps to.

- \end{document}

Example


Yap 2.4.1803 - [Presentation.dvi]
File View Tools Window Help
How to insert an image in LateX
Well lets see how this works. What can you really do with this software, can we insert an image after a paragraph? Are we able to insert an image inline with the text. Are there other features to be had with inserting an image with LaTeX.
OBEY
More text to see where it wraps to.
Presentation.tex L:10
193,196pt
Page: 1 (1st of 1)

Other Images (eps, gif …)

- Use epsfig package
- `\usepackage{epsfig}`
- Including images in main body
- `\epsfig{file=filename.eps, width=10cm, height=9cm, angle=90}`
- Creating EPS - Use xv and/or xfig.
- MS Power Point, save as GIF and convert to EPS.

Figures

```
% This is an example.tex

\documentclass [12pt]{article}
\usepackage {epsfig, graphicx}
\begin {document}

\begin {figure}
\epsfxsize =4.5in
\centerline {\epsffile{platypus.eps}}
\caption {Sample Figure.}
\label {fig1}
\end {figure}

\end {document}
```

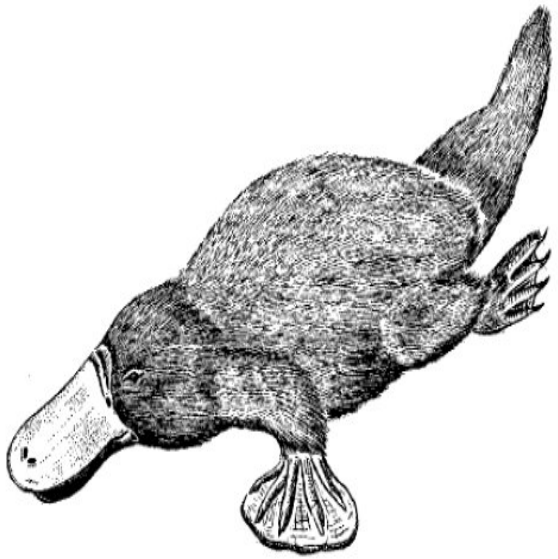
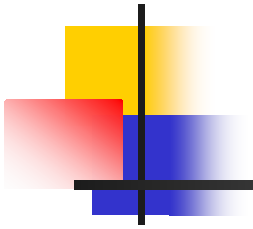


Figure 1: Sample Figure.



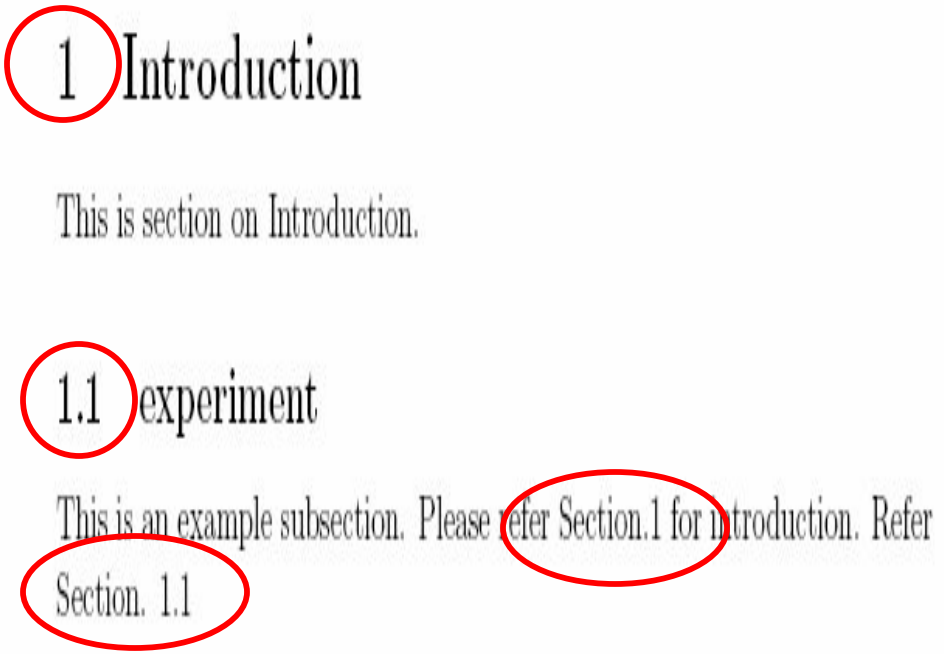
Tips and Tricks

Labels and references

```
\section{Labels and References}
\label{sec:lab-ref}

% other stuff cut out…

For example, in section~\ref{sec:tls}, we
discussed sectioning commands.
Section~\ref{sec:3rd-ls} was a 3rd level
section.
In section~\ref{sec:lab-ref}, we discussed
labels and references.
```

References within a document

```
% This is an example.tex
\documentclass [12pt]{article}

\begin {document}
\section {Introduction}
\label {intro}

This is section on Introduction.

\subsection {experiment}
\label {exp}

This is an example subsection.
Please refer Section.\ref {intro} for
introduction. Refer Section \ref {exp}

\end {document}
```

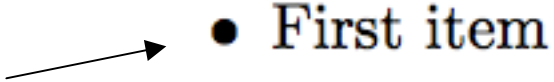


Very easy to manage all the references in long documents

Lists

- Bulleted Lists:

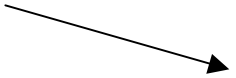
```
\begin{itemize}
\item First item.
\end{itemize}
```



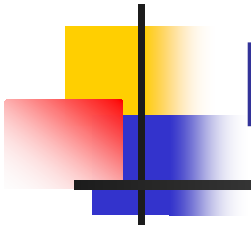
- First item

- Enumerated Lists (automatically counted):

```
\begin{enumerate}
\item \label{it1} This is
    the first item.
\end{enumerate}
```

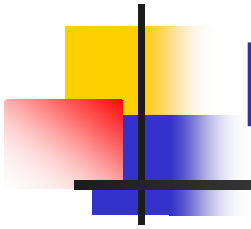


1. This is the first item.



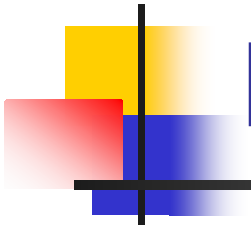
Lists

- Source
  - `\begin{itemize}`
  - `\item Apple`
  - `\item Orange`
  - `\end{itemize}`
- Result
  - Apple
  - Orange



Lists

- `Enumerate` instead of `itemize` gives a numbered list
- Lists can be recursive



Font Styles

- Change appearance of text
- Forms:

```
\texttt{TeleType text}
\textbf{BoldFace text}
\textsl{Slanted text}
\textit{ITalicized text.}
\textrm{RoMan}
\textsc{Small Caps}
\textsf{Sans Serif}
```

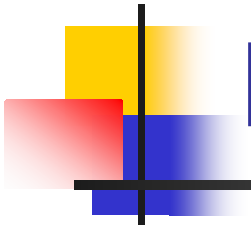
Font size |tiny to |Huge

```
% This is 381.tex

\documentclass [12pt]{article}

\begin {document}
\noindent
This is a test \\
\small {This is a test}\\
\Large {This is a test}\\
\Huge {This is a test}\\

\end {document}
```

This is a test

This is a test

This is a test



Paper Citations

- Place \cite{*key*} where you want citation to appear
  - *key* is unique citation key
  - generates reference label at that spot
- Need to add special bibliography environment with papers
  - DON'T BOTHER! USE BibTeX instead!

Citing other works

```
% This is an example.tex
\documentclass [12pt]{article}
\bibliographystyle {IEEEtran}
\begin {document}
\section {Introduction}
\label {intro}

This is section on Introduction.

\subsection {experiment}
\label {exp}

This is an example subsection. This
work is based on the
MP algorithm \cite {mallat2}

\bibliography {bibfile}
\end {document}
```

1 Introduction

This is section on Introduction.

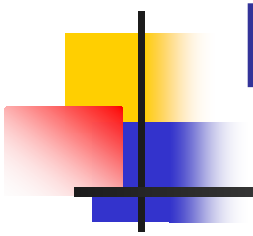
1.1 experiment

This is an example subsection. This work is based on the MP algorithm [1]

References

[1] S. G. Mallat and Z. Zhang, "Matching pursuit with time-frequency dictionaries," *IEEE Trans. Signal Processing*, vol. 41, no. 12, pp. 3397–3415, 1993.

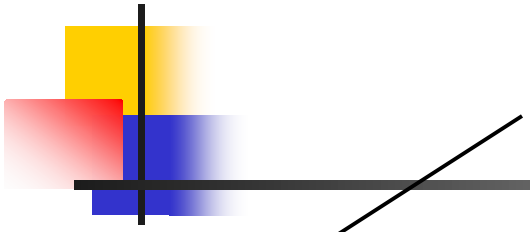
Order and numbering of the references are automatic. Inserting a new citation reorders the references (a cool feature !)



BibTeX

- BibTeX manages citations
- Add following to body of your doc
  - \bibliographystyle{*type*}
    - *type* = style (plain, abbrv, alpha)
    - Other styles available (see natbib)
  - \bibliography{*bib-files*}
    - *bib-files* are your BibTeX files with citations
    - This command appears where you the bibliography (usually end of document)

Example Bib File



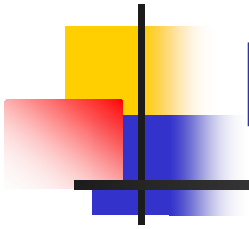
```
@String{cl = "Computer Languages"}

@Article{ChaitinEA-CL81,
  title={Register Allocation Via Coloring},
  author={G.J. Chaitin and Auslander, M.A.
          and Chandra, A.K.
          and Cocke, J. and Hopkins, M.E.
          and Markstein, P.W.},
  journal=cl,
  volume={6},
  number={1},
  pages={47--57},
  year={1981}
}
```

Define string abbreviation

Citation key for \cite

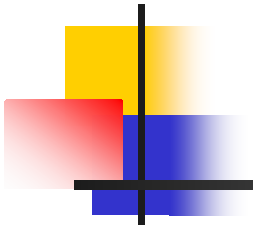
BibTeX entry for article.

Authors separated by and



BibTeX Examples

- Create document:
  - latex doc.tex
  - bibtex doc
  - latex doc.tex
  - latex doc.tex
- Since I'm out of time, see examples in
  - Example.tex
  - Example.pdf
  - Ex.bib



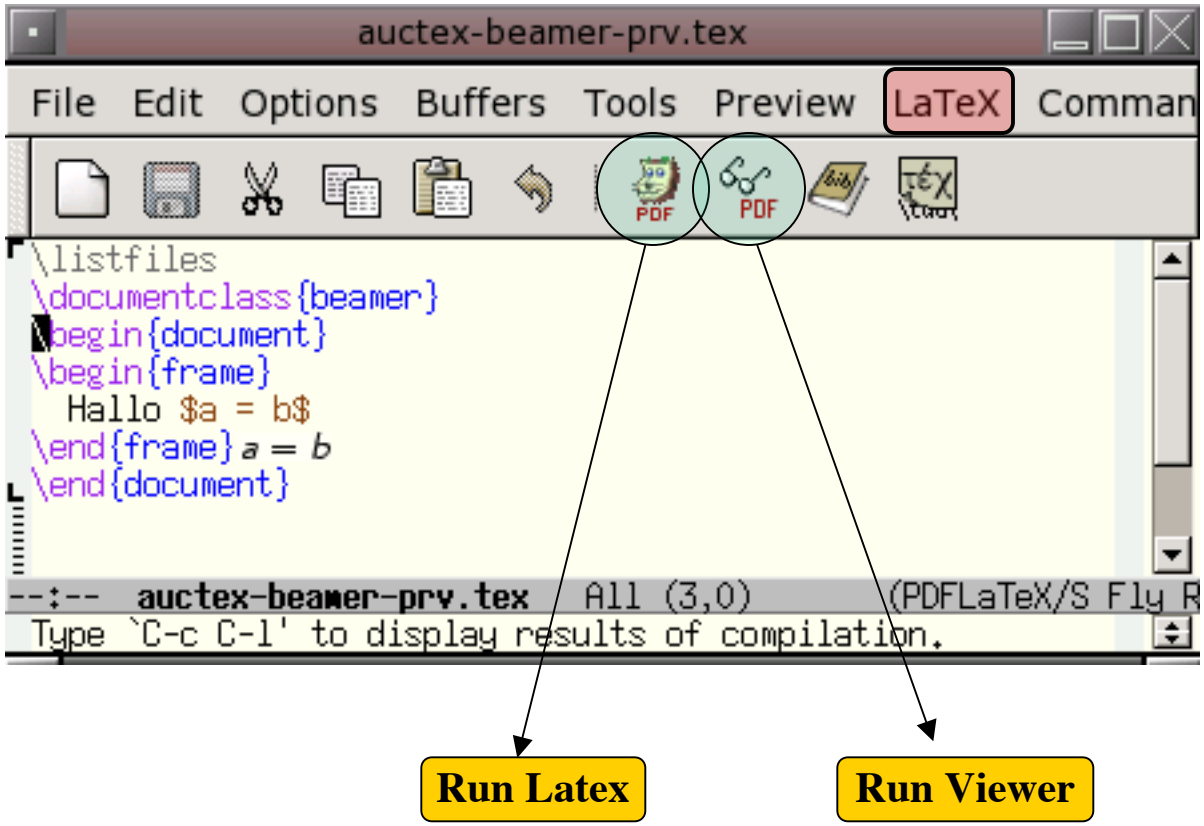
Emacs

and

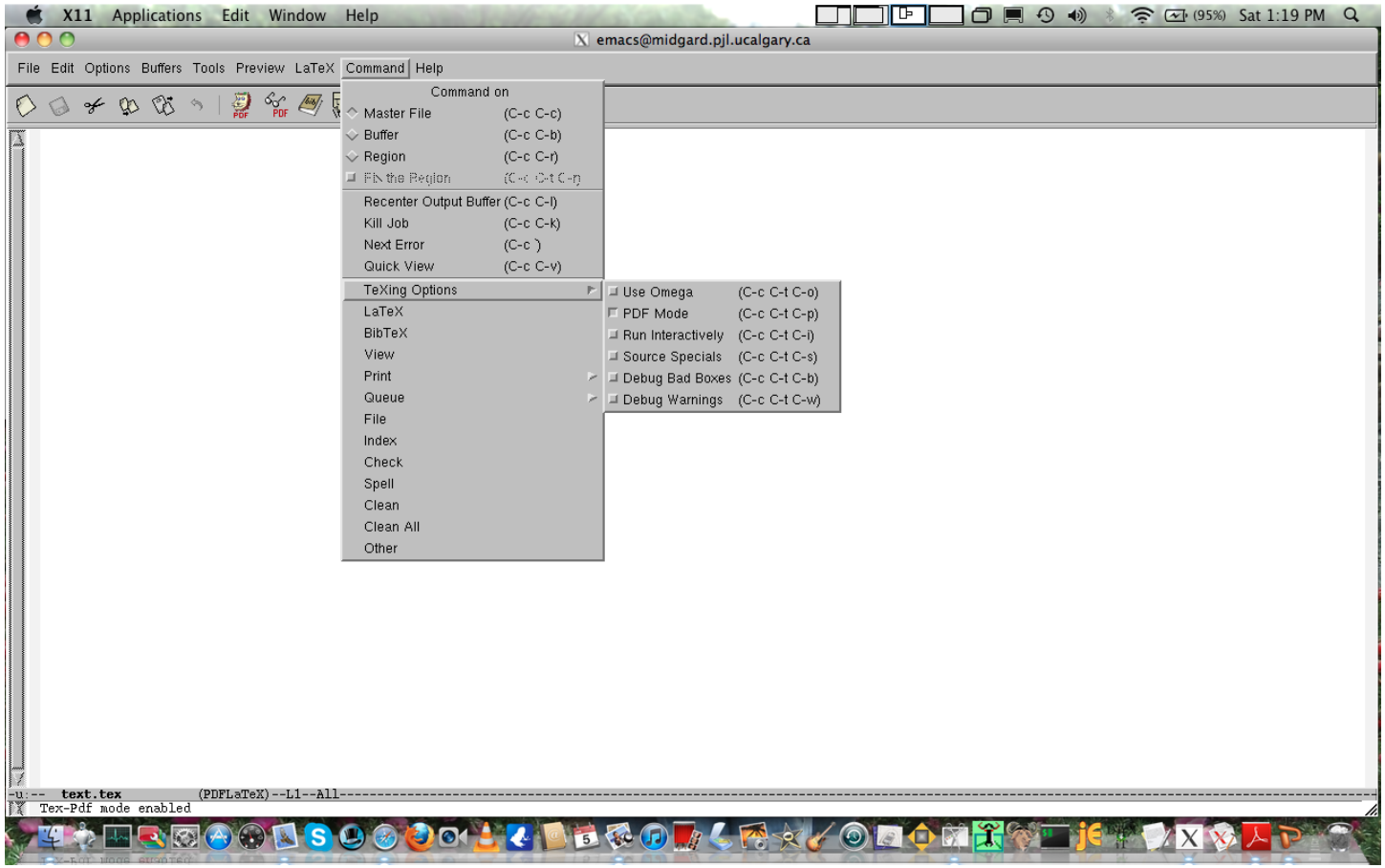
Latex

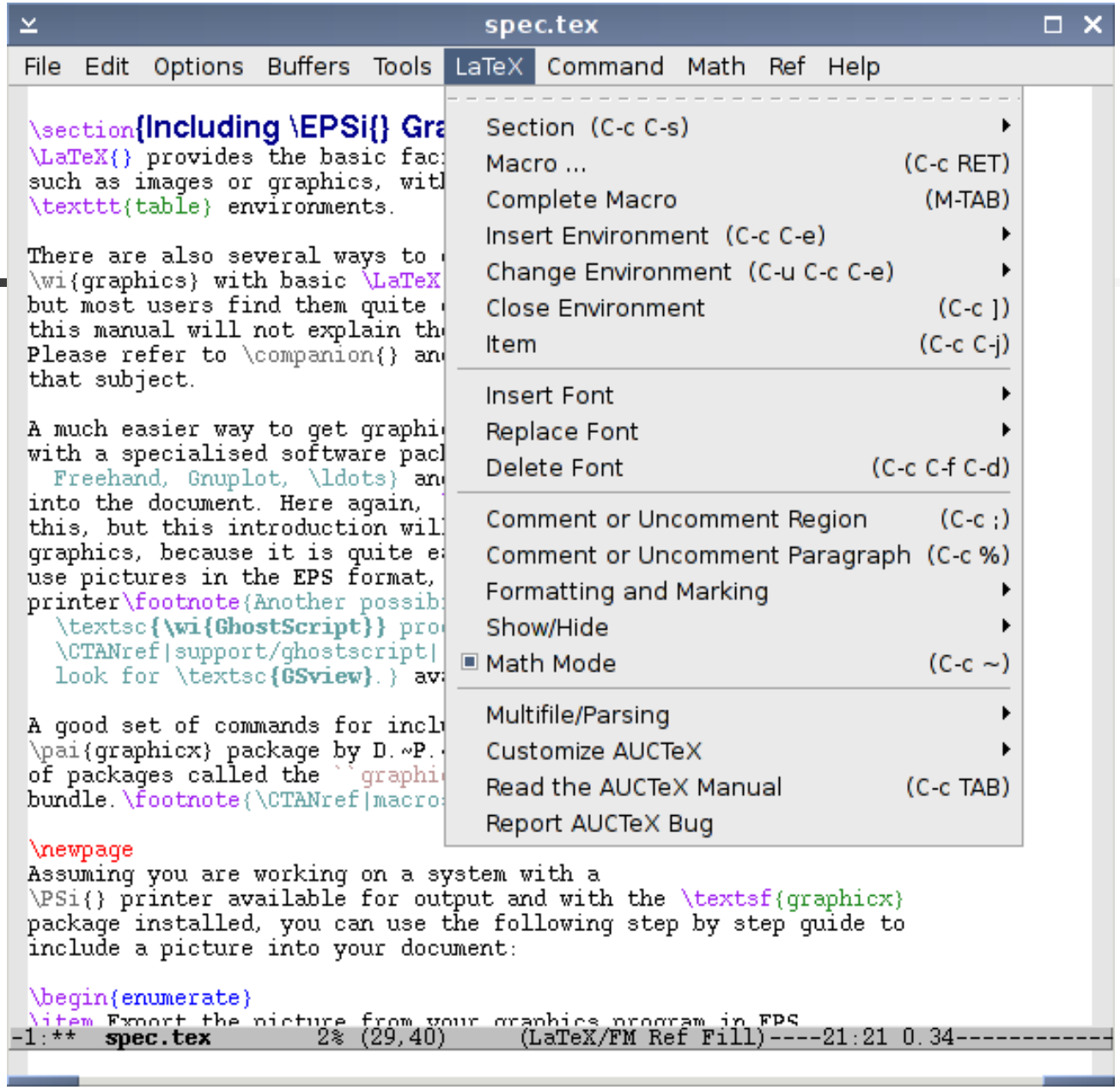
Don’t forget this

> emacs yourfile.tex &



The PDFLatex Option




spec.tex
File Edit Options Buffers Tools LaTeX Command Math Ref Help
Section (C-c C-s)
Macro ... (C-c RET)
Complete Macro (M-TAB)
Insert Environment (C-c C-e)
Change Environment (C-u C-c C-e)
Close Environment (C-c])
Item (C-c C-j)
Insert Font
Replace Font
Delete Font (C-c C-f C-d)
Comment or Uncomment Region (C-c ;)
Comment or Uncomment Paragraph (C-c %)
Formatting and Marking
Show/Hide
Math Mode (C-c ~)
Multifile/Parsing
Customize AUCTeX
Read the AUCTeX Manual (C-c TAB)
Report AUCTeX Bug
\section{Including \EPSi{} Gra
\LaTeX{} provides the basic fac
such as images or graphics, wit
\texttt{table} environments.
There are also several ways to
\wi{graphics} with basic \LaTeX
but most users find them quite
this manual will not explain th
Please refer to \companion{} an
that subject.
A much easier way to get graphi
with a specialised software pac
Freehand, Gnuplot, \ldots} an
into the document. Here again,
this, but this introduction wil
graphics, because it is quite e
use pictures in the EPS format,
printer\footnote{Another possib
\textsc{\wi{GhostScript}} pro
\CTANref|support/ghostscript|
look for \textsc{GSview}.} av
A good set of commands for incl
\pai{graphicx} package by D.~P.
of packages called the ``graphi
bundle.\footnote{\CTANref|macro
\newpage
Assuming you are working on a system with a
\PSi{} printer available for output and with the \textsf{graphicx}
package installed, you can use the following step by step guide to
include a picture into your document:
\begin{enumerate}
\item Export the picture from your graphics program in EPS
-1:** spec.tex 2% (29,40) (LaTeX/FM Ref Fill)----21:21 0.34----------