



# **Technical Writing and Presentation**

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## Proudly created by

Except for the figures created by Matlab, this document has been created by *Free and open source software* (FOSS). Special thanks go to the numerous generous developers behind the following projects:

**GNU project** free software, mass collaboration project aiming to give users freedom

**L<sup>A</sup>T<sub>E</sub>X** document markup language

**T<sub>E</sub>X Live** cross-platform L<sup>A</sup>T<sub>E</sub>X distribution

**MiK<sub>T</sub>E<sub>X</sub>** L<sup>A</sup>T<sub>E</sub>X distribution for Windows

**L<sub>y</sub>X** cross-platform L<sup>A</sup>T<sub>E</sub>X-based document preparation system

**Beamer** L<sup>A</sup>T<sub>E</sub>X class for creating presentation slides and handouts

**Inkscape** cross-platform vector graphics editor

**T<sub>E</sub>X Text** Inkscape plugin for creating and editing L<sup>A</sup>T<sub>E</sub>X formulae

**Other** great projects I failed to mention ...

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# 1 Technical Writing

## Word Processors

Usually there are two categories of word processing software packages

- What You See Is What You Get (WYSIWYG)
- What You See Is What You Mean (WYSIWYM)

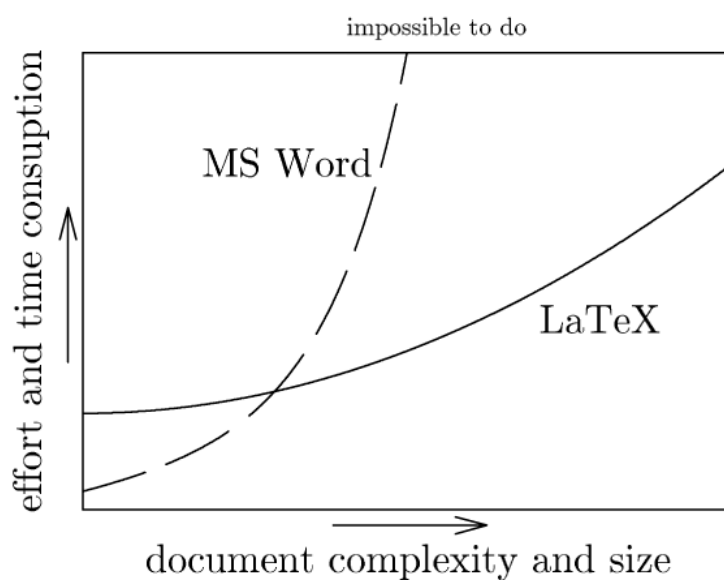
WYSIWYG	WYSIWYM
Microsoft Word LibreOffice Writer AbiWord Calligra Words	$\text{\LaTeX}$ $\text{\LyX}$

**Roughly**, you can compare  $\text{\LaTeX}$  to Word as you compare Matlab to Excel

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1

## $\text{\LaTeX}$ vs Microsoft Word




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2

## 1.1 L<sup>A</sup>T<sub>E</sub>X

L<sup>A</sup>T<sub>E</sub>X is a document markup language.

- Simply you can think of it as similar to HTML<sup>1</sup>
- In order to create a document in L<sup>A</sup>T<sub>E</sub>X, a **.tex** file must be created using some text editor
- The **.tex** file is then compiled to produce the document
- L<sup>A</sup>T<sub>E</sub>X can generate several document formats including “pdf”

### L<sup>A</sup>T<sub>E</sub>X is Free

**Although** being free is an advantage, but it is a drawback at the same time

- Slow download server
- No clean official documentation
- Several alternatives to do the same thing

**However;** L<sup>A</sup>T<sub>E</sub>X is very mature and widely used by professional/enterprise publishers

- Also it has a big user community
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution

---

<sup>1</sup>(HyperText Markup Language)

# L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Cheat Sheet

## Document classes

`book` Default is two-sided.  
`report` No `\part` divisions.  
`article` No `\part` or `\chapter` divisions.  
`letter` Letter (?).  
`slides` Large sans-serif font.

Used at the very beginning of a document:  
`\documentclass{class}`. Use `\begin{document}` to start contents and `\end{document}` to end the document.

## Common documentclass options

`10pt/11pt/12pt` Font size.  
`letterpaper/a4paper` Paper size.  
`twocolumn` Use two columns.  
`twoside` Set margins for two-sided.  
`landscape` Landscape orientation. Must use `dvips` -t landscape.

`draft` Double-space lines.  
Usage: `\documentclass[opt, opt]{class}`.

## Packages

`fullpage` Use 1 inch margins.  
`ansysize` Set margins: `\marginsize{l}{r}{t}{b}`.  
`multicol` Use *n* columns: `\begin{multicols}{n}`.  
`latexsym` Use L<sup>A</sup>T<sub>E</sub>X symbol font.  
`graphicx` Show image: `\includegraphics[width=x]{file}`.  
`url` Insert URL: `\url{http://...}`.  
Use before `\begin{document}`. Usage: `\usepackage{package}`

## Title

`\author{text}` Author of document.  
`\title{text}` Title of document.  
`\date{text}` Date.  
These commands go before `\begin{document}`. The declaration `\maketitle` goes at the top of the document.

## Miscellaneous

`\pagestyle{empty}` Empty header, footer and no page numbers.  
`\tableofcontents` Add a table of contents here.

## Document structure

`\part{title}` `\subsubsection{title}`  
`\chapter{title}` `\paragraph{title}`  
`\section{title}` `\subparagraph{title}`  
`\subsection{title}`  
Use `\setcounter{secnumdepth}{x}` suppresses heading numbers of depth > *x*, where `chapter` has depth 0. Use a \*, as in `\section*{title}`, to not number a particular item—these items will also not appear in the table of contents.

## Text environments

`\begin{comment}` Comment (not printed). Requires `verbatim` package.  
`\begin{quote}` Indented quotation block.  
`\begin{quotation}` Like quote with indented paragraphs.  
`\begin{verse}` Quotation block for verse.

## Lists

`\begin{enumerate}` Numbered list.  
`\begin{itemize}` Bulleted list.  
`\begin{description}` Description list.  
`\item text` Add an item.  
`\item[x] text` Use *x* instead of normal bullet or number. Required for descriptions.

## References

`\label{marker}` Set a marker for cross-reference, often of the form `\label{sec:item}`.  
`\ref{marker}` Give section/body number of marker.  
`\pageref{marker}` Give page number of marker.  
`\footnote{text}` Print footnote at bottom of page.

## Floating bodies

`\begin{table}[place]` Add numbered table.  
`\begin{figure}[place]` Add numbered figure.  
`\begin{equation}[place]` Add numbered equation.  
`\caption{text}` Caption for the body.

The *place* is a list valid placements for the body. t=top, h=here, b=bottom, p=separate page, !=place even if ugly. Captions and label markers should be within the environment.

## Text properties

### Font face

Command	Declaration	Effect
<code>\textrm{text}</code>	<code>\rmfamily text</code>	Roman family
<code>\textsf{text}</code>	<code>\sffamily text</code>	Sans serif family
<code>\texttt{text}</code>	<code>\ttfamily text</code>	Typewriter family
<code>\textmd{text}</code>	<code>\mdseries text</code>	Medium series
<code>\textbf{text}</code>	<code>\bfseries text</code>	<b>Bold series</b>
<code>\textup{text}</code>	<code>\upshape text</code>	Upright shape
<code>\textit{text}</code>	<code>\itshape text</code>	<i>Italic shape</i>
<code>\textsl{text}</code>	<code>\slshape text</code>	<i>Slanted shape</i>
<code>\textsc{text}</code>	<code>\scshape text</code>	SMALL CAPS SHAPE
<code>\emph{text}</code>	<code>\em text</code>	<i>Emphasized</i>
<code>\textnormal{text}</code>	<code>\normalfont text</code>	Document font
<code>\underline{text}</code>		<u>Underline</u>

The command `(tttt)` form handles spacing better than the declaration `(tttt)` form.

### Font size

<code>\tiny</code>	<small>tiny</small>	<code>\Large</code>	Large
<code>\scriptsize</code>	<small>scriptsize</small>	<code>\LARGE</code>	LARGE
<code>\footnotesize</code>	<small>footnotesize</small>	<code>\huge</code>	huge
<code>\small</code>	<small>small</small>	<code>\Huge</code>	Huge
<code>\normalsize</code>	<small>normalsize</small>		
<code>\large</code>	<small>large</small>		

These are declarations and should be used in the form `{\small ...}`, or without braces to affect the entire document.

## Verbatim text

`\begin{verbatim}` Verbatim environment.  
`\begin{verbatim*}` Spaces are shown as `_`.  
`\verb!text!` Text between the delimiting characters (in this case ‘!’) is verbatim.

## Justification

Environment	Declaration
<code>\begin{center}</code>	<code>\centering</code>
<code>\begin{flushleft}</code>	<code>\raggedright</code>
<code>\begin{flushright}</code>	<code>\raggedleft</code>

## Miscellaneous

`\linespread{x}` changes the line spacing by the multiplier *x*.

## Text-mode symbols

### Symbols

<code>&amp;</code>	<code>\&amp;</code>	<code>-</code>	<code>\_</code>	<code>...</code>	<code>\ldots</code>	<code>•</code>	<code>\textbullet</code>
<code>\$</code>	<code>\\$</code>	<code>^</code>	<code>\^{}{}</code>	<code> </code>	<code>\textbar</code>	<code>\</code>	<code>\textbackslash</code>
<code>%</code>	<code>\%</code>	<code>~</code>	<code>\~{}{}</code>	<code>#</code>	<code>\#</code>	<code>§</code>	<code>\S</code>

### Accents

<code>ò</code>	<code>\’o</code>	<code>ó</code>	<code>\~o</code>	<code>ô</code>	<code>\^o</code>	<code>õ</code>	<code>\=o</code>
<code>ö</code>	<code>\.o</code>	<code>ë</code>	<code>\c o</code>	<code>ö</code>	<code>\v o</code>	<code>ő</code>	<code>\H o</code>
<code>ç</code>	<code>\c c</code>	<code>ø</code>	<code>\d o</code>	<code>ø</code>	<code>\b o</code>	<code>ö</code>	<code>\t oo</code>
<code>œ</code>	<code>\OE</code>	<code>æ</code>	<code>\ae</code>	<code>Æ</code>	<code>\AE</code>	<code>ä</code>	<code>\aa</code>
<code>ø</code>	<code>\o</code>	<code>Ø</code>	<code>\O</code>	<code>ı</code>	<code>\l</code>	<code>L</code>	<code>\L</code>
<code>j</code>	<code>\j</code>	<code>ı</code>	<code>\i</code>	<code>ı</code>	<code>\i</code>	<code>ı</code>	<code>\i</code>

### Delimiters

<code>‘</code>	<code>“</code>	<code>‘‘</code>	<code>{ \{</code>	<code>[ [</code>	<code>( (</code>	<code>&lt;</code>	<code>\textless</code>
<code>’</code>	<code>”</code>	<code>’’</code>	<code>} \}</code>	<code>] ]</code>	<code>) )</code>	<code>&gt;</code>	<code>\textgreater</code>

### Dashes

Name	Source	Example	Usage
hyphen	-	X-ray	In words.
en-dash	--	1-5	Between numbers.
em-dash	---	Yes—or no?	Punctuation.

## Line and page breaks

`\` Begin new line without new paragraph.  
`\*` Prohibit pagebreak after linebreak.  
`\kill` Don’t print current line.  
`\pagebreak` Start new page.  
`\noindent` Do not indent current line.

## Miscellaneous

`\today` February 25, 2014.  
`\$sim$` Prints `~` instead of `\~{}{}`, which makes `~`.  
`~` Space, disallow linebreak (W.J.~Clinton).  
`\@.` Indicate that the `.` ends a sentence when following an uppercase letter.  
`\hspace{l}` Horizontal space of length *l* (Ex: *l* = 20pt).  
`\vspace{l}` Vertical space of length *l*.  
`\rule{w}{h}` Line of width *w* and height *h*.

## Tabular environments

### tabbing environment

`\=` Set tab stop. `\>` Go to tab stop.  
Tab stops can be set on “invisible” lines with `\kill` at the end of the line. Normally `\` is used to separate lines.

tabular environment

```
\begin{array}[pos]{cols}
\begin{tabular}[pos]{cols}
\begin{tabular*}{width}[pos]{cols}
```

tabular column specification

```
l      Left-justified column.
c      Centered column.
r      Right-justified column.
p{width} Same as \parbox[t]{width}.
@{decl} Insert decl instead of inter-column space.
|      Inserts a vertical line between columns.
```

tabular elements

```
\hline      Horizontal line between rows.
\cline{x-y} Horizontal line across columns x through y.
\multicolumn{n}{cols}{text}
           A cell that spans n columns, with cols column
           specification.
```

Math mode

For inline math, use  $\backslash (...)$  or  $\$...\$$ . For displayed math, use  $\backslash [...]$  or  $\backslash begin{equation}$ .

```
Superscriptx      ~{x}      Subscriptx      _{x}
 $\frac{x}{y}$       \frac{x}{y}       $\sum_{k=1}^n$       \sum_{k=1}^n
 $\sqrt[n]{x}$       \sqrt[n]{x}       $\prod_{k=1}^n$       \prod_{k=1}^n
```

Math-mode symbols

```
≤ \leq      ≥ \geq      ≠ \neq      ≈ \approx
× \times    ÷ \div      ± \pm      · \cdot
° ~{\circ}  ° \circ      ′ \prime  ... \cdots
∞ \infty    ¬ \neg      ∧ \wedge  ∨ \vee
⊃ \supset    ∀ \forall      ∈ \in      → \rightarrow
⊂ \subset    ∃ \exists      ∉ \notin  ⇒ \Rightarrow
∪ \cup      ∩ \cap      | \mid    ⇔ \Leftrightarrow
â \dot a    â \hat a    ā \bar a    ã \tilde a
α \alpha    β \beta     γ \gamma     δ \delta
ε \epsilon   ζ \zeta      η \eta      ε \varepsilon
θ \theta     ι \iota      κ \kappa     ϑ \vartheta
λ \lambda     μ \mu      ν \nu      ξ \xi
π \pi        ρ \rho      σ \sigma     τ \tau
υ \upsilon    φ \phi      χ \chi      ψ \psi
ω \omega     Γ \Gamma     Δ \Delta     Θ \Theta
Λ \Lambda     Ξ \Xi      Π \Pi       Σ \Sigma
Υ \Upsilon    Φ \Phi     Ψ \Psi      Ω \Omega
```

Bibliography and citations

When using BibTeX, you need to run latex, bibtex, and latex twice more to resolve dependencies.

Citation types

```
\cite{key}      Full author list and year. (Watson and Crick 1953)
\citeA{key}     Full author list. (Watson and Crick)
\citeN{key}     Full author list and year. Watson and Crick (1953)
\shortcite{key} Abbreviated author list and year. ?
\shortciteA{key} Abbreviated author list. ?
\shortciteN{key} Abbreviated author list and year. ?
\citeyear{key}  Cite year only. (1953)
All the above have an NP variant without parentheses; Ex.
\citeNP.
```

BibTeX entry types

```
@article      Journal or magazine article.
@book         Book with publisher.
@booklet      Book without publisher.
@conference   Article in conference proceedings.
@inbook       A part of a book and/or range of pages.
@incollection A part of book with its own title.
@misc         If nothing else fits.
@phdthesis    PhD. thesis.
@proceedings  Proceedings of a conference.
@techreport   Tech report, usually numbered in series.
@unpublished  Unpublished.
```

BibTeX fields

```
address      Address of publisher. Not necessary for major publishers.
author       Names of authors, of format ....
booktitle    Title of book when part of it is cited.
chapter      Chapter or section number.
edition      Edition of a book.
editor       Names of editors.
institution  Sponsoring institution of tech. report.
journal      Journal name.
key          Used for cross ref. when no author.
month        Month published. Use 3-letter abbreviation.
note         Any additional information.
number       Number of journal or magazine.
organization Organization that sponsors a conference.
pages        Page range (2,6,9--12).
publisher    Publisher's name.
school       Name of school (for thesis).
series       Name of series of books.
title        Title of work.
type         Type of tech. report, ex. "Research Note".
volume       Volume of a journal or book.
year         Year of publication.
```

Not all fields need to be filled. See example below.

Common BibTeX style files

```
abbrv  Standard      abstract  alpha with abstract
alpha  Standard      apa       APA
plain  Standard      unsrt     Unsorted
```

The L<sup>A</sup>T<sub>E</sub>X document should have the following two lines just before  $\backslash end{document}$ , where bibfile.bib is the name of the BibTeX file.

```
\bibliographystyle{plain}
\bibliography{bibfile}
```

BibTeX example

The BibTeX database goes in a file called file.bib, which is processed with bibtex file.

```
@String{N = {Na\~{t}ure}}
@Article{WC:1953,
  author = {James Watson and Francis Crick},
  title = {A structure for Deoxyribose Nucleic Acid},
  journal = N,
  volume = {171},
  pages = {737},
  year = 1953
}
```

Sample L<sup>A</sup>T<sub>E</sub>X document

```
\documentclass[11pt]{article}
\usepackage{fullpage}
\title{Template}
\author{Name}
\begin{document}
\maketitle

\section{section}
\subsection*{subsection without number}
text \textbf{bold text} text. Some math:  $\$2+2=5\$$ 
\subsection{subsection}
text \emph{emphasized text} text. \cite{WC:1953}
discovered the structure of DNA.
```

```
A table:
\begin{table}[!th]
\begin{tabular}{|l|c|r|}
\hline
first & row & data \\
second & row & data \\
\hline
\end{tabular}
\caption{This is the caption}
\label{ex:table}
\end{table}
```

```
The table is numbered \ref{ex:table}.
\end{document}
```



## **L<sup>A</sup>T<sub>E</sub>X Editors/IDE**

- To write C/C++ code, any text editor can be used
  - But using a good IDE can greatly ease your job
- L<sup>A</sup>T<sub>E</sub>X is similar
  - Any text editor is OK, but a dedicated L<sup>A</sup>T<sub>E</sub>X editor/IDE is strongly recommended
- A dedicated L<sup>A</sup>T<sub>E</sub>X editor/IDE
  - can highlight and auto complete L<sup>A</sup>T<sub>E</sub>X keywords
  - has several L<sup>A</sup>T<sub>E</sub>X templates for several types of documents
  - facilitates compiling and debugging
  - ...
- Sample L<sup>A</sup>T<sub>E</sub>X editors are:  
**Texstudio**; cross-platform  
**Kile**; for Linux  
**and** many others

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## **Arabic Support**

Thanks to the “Arabi”<sup>2</sup> package, Arabic and Farsi languages are supported with the “Babel” package.

- However, since arabic users are few, “Arabi” package is not mature enough and some minor bugs do exist
  - Googling about these bugs, usually you find the same of similar bugs do exist in other languages, and hence you can infer solutions/workarounds

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## **Keep Concentrating**

Due to its WYSIWYM nature, I feel more concentrating while using L<sup>A</sup>T<sub>E</sub>X as compared to **Ms-Word**.

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## **Installing L<sup>A</sup>T<sub>E</sub>X**

- Install L<sup>A</sup>T<sub>E</sub>X implementation. Notable implementations are:
  - **MiK<sub>T</sub><sub>E</sub>X** Windows only<sup>3</sup>
  - **T<sub>E</sub>X Live** cross-platform<sup>4</sup>

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<sup>2</sup>Thanks to GOD at first of course

<sup>3</sup>Download the full MiK<sub>T</sub><sub>E</sub>X. This is done using the “**Net Installer**”. First, download the full MiK<sub>T</sub><sub>E</sub>X. After download completes, run the downloaded installer and install the full MiK<sub>T</sub><sub>E</sub>X.

<sup>4</sup>Available for MS-Windows, Mac OS and Linux

- Install T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X editor/IDE. Notable examples include:
  - **Texstudio** cross-platform<sup>4</sup>
  - **Kile** for Linux
  - ...

## Porting L<sup>A</sup>T<sub>E</sub>X Documents

Usually .tex files often reference other files (images, bibliography databases, ...).

- Hence, if you want to copy a L<sup>A</sup>T<sub>E</sub>X document to another computer, you have to copy all the referenced files as well

## 1.2 L<sub>Y</sub>X

L<sub>Y</sub>X is a graphical front-end to L<sup>A</sup>T<sub>E</sub>X.

- You can think of the L<sub>Y</sub>X-L<sup>A</sup>T<sub>E</sub>X relationship as similar to the Visual Studio-C++ compiler relationship
- Unlike L<sup>A</sup>T<sub>E</sub>X, L<sub>Y</sub>X comes with tidy and very good documentation
- Also it has a big community, i.e.,
  - it is mature enough
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution

## Keep your concentration

Due to its WYSIWYM nature, I feel very concentrating while using **L<sub>Y</sub>X** as compared to **Ms-Word**.

## Arabic Support

Arabic is supported in L<sub>Y</sub>X.

## Installing L<sub>Y</sub>X

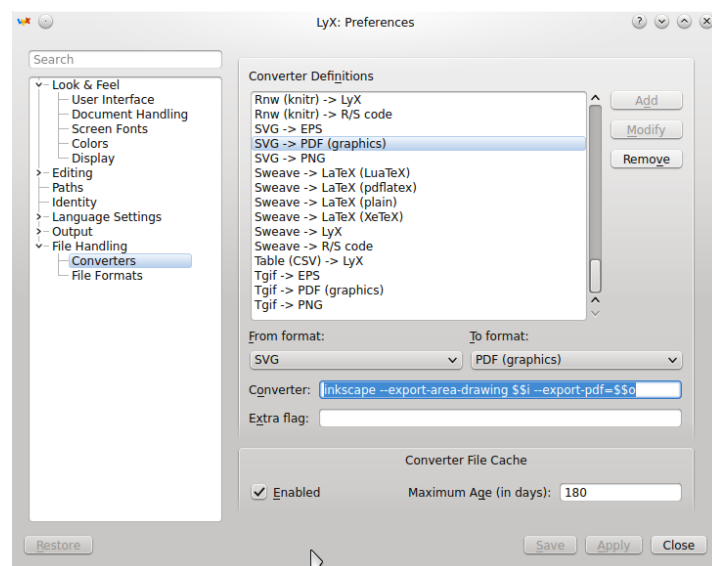
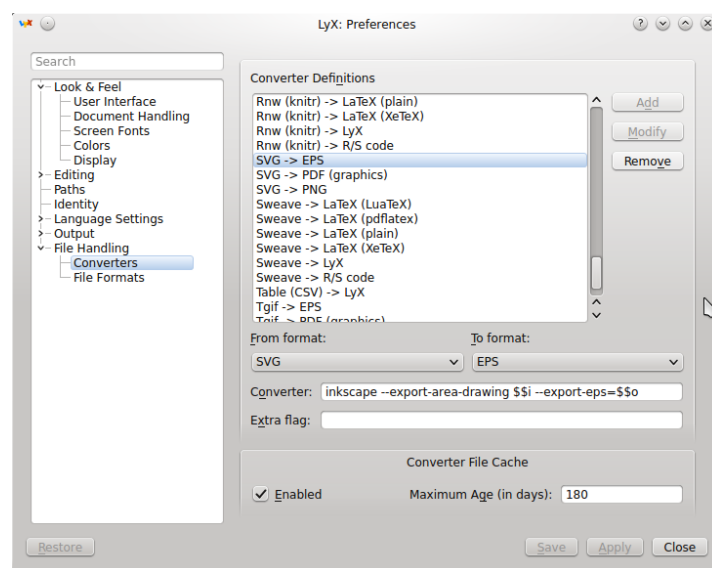
The following installation sequence is recommended:

1. Install Inkscape
  - Confirm path to inkscape.exe is added to the “PATH” environment variable
2. Install the full MiK<sub>T</sub>E<sub>X</sub> (or T<sub>E</sub>X Live)
3. Install L<sub>Y</sub>X

## Configuring Converters

SVG is the file format used by the Inkscape graphing SW. Therefore, confirm that LyX uses Inkscape<sup>5</sup> to convert SVG files as follows:

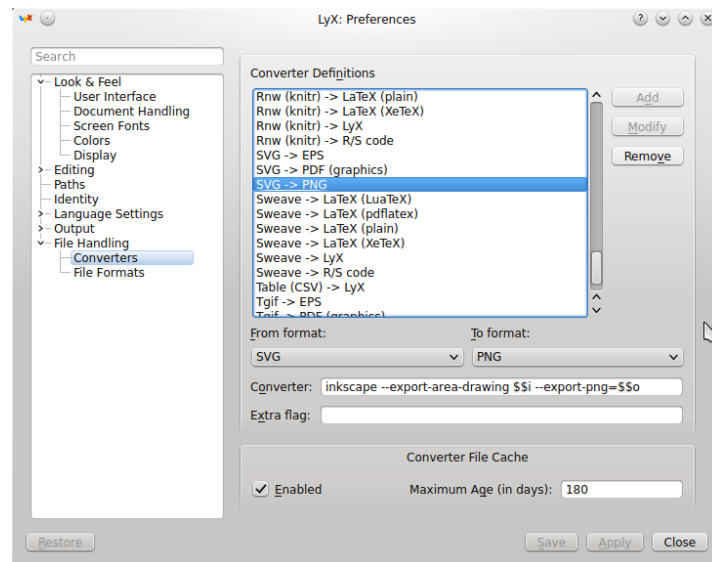
- Tools > Preferences > File Handling > Converters ><sup>6</sup>
  - SVG -> EPS > Converter > inkscape \$\$i --export-area-drawing --export-type="eps"
  - SVG -> PDF > Converter > inkscape \$\$i --export-area-drawing --export-type="pdf"
  - SVG -> PNG > Converter > inkscape \$\$i --export-type="png"
  - GIF -> PNG > Converter > magick convert '\$\$i[0]' \$\$o<sup>7</sup>



<sup>5</sup>Make sure that the Inkscape is installed, and the path of “inkscape.exe” is added to “path” environment variable. You can test this by executing “inkscape” from the command prompt.

<sup>6</sup>Note that Inkscape CLI has changed since version 1.0 [[https://wiki.inkscape.org/wiki/index.php/Using\\_the\\_Command\\_Line#Changes\\_from\\_0.92](https://wiki.inkscape.org/wiki/index.php/Using_the_Command_Line#Changes_from_0.92)]

<sup>7</sup>For ImageMagick older than release 7.x, use “convert '\$\$i[0]' \$\$o”



## Learning LyX

- **Explore** style-list, menus and toolbars.
- **Help menu** includes *very good* manuals.
  - Manuals themselves are LyX documents
    - \* So they are essentially very good LyX examples
  - You may begin with:
    - \* Introduction
    - \* Tutorial
- **C:\Program Files (x86)\LyX 2.3\Resources** folder contains wide variety of very good examples

## Porting LyX Documents

Similar to  $\text{\LaTeX}$  documents, .lyx files often reference other files (images, bibliography databases, ...).

- Hence, if you want to copy a LyX document to another computer, you have to copy all the referenced files as well

## 1.3 Beamer

Beamer is a  $\text{\LaTeX}$  class for creating **professional** presentation slides.

- Beamer can also be easily used within LyX

## Including Videos

Use the multimedia package. For example, the following animation is produced using:

```
\movie[externalviewer]{\includegraphics[width=0.7\textheight]{movieThumbnail.png}}
```

---

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## Including Gif Animations

- Refer to <https://tex.stackexchange.com/questions/240243/getting-gif-and-or-moving-images-into-a-latex-presentation> for details

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## Presentation Handouts

Beamer-Article is a L<sup>A</sup>T<sub>E</sub>X class that renders Beamer slides on a standard sized paper<sup>8</sup> to create *professional* presentation handouts.

- Frame titles are used as paragraph titles
- Slide layout/colors are not rendered
- Sectioning is kept
- Beamer-Article can be easily used within L<sup>A</sup>T<sub>E</sub>X

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## Keep your concentration

Due to its WYSIWYM nature, I feel very very very concentrating while using **L<sup>A</sup>T<sub>E</sub>X-Beamer** as compared to **Ms-Power Point**.

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## Installing Beamer

- Beamer class is usually installed by default with MiK<sub>T</sub>E<sub>X</sub>, T<sub>E</sub>XLive
- Also templates for both Beamer-presentation and Beamer-article are included by default with L<sup>A</sup>T<sub>E</sub>X

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<sup>8</sup>like A4 or letter

## Learning Beamer

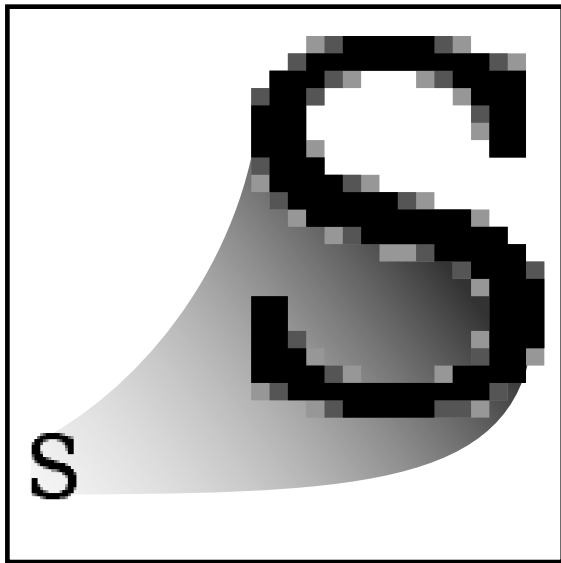
- From **LyX**  
**Help** > Specific Manuals > Beamer Presentations  
**Explore** the styles list and Insert menu<sup>9</sup>
- **Beamer User Guide** explain creating Beamer presentations in plain  $\text{\LaTeX}$  and **LyX** as well
- For **customization** of Beamer presentations, check the “BEAMER appearance cheat sheet” at <http://science.thilucmic.fr>
- For various **themes** of Beamer presentation, check <http://www.hartwork.org/beamer-theme-matrix/>
- Also a very good variety of presentations are attached to this course

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<sup>9</sup>Styles will be available after you set the current document type to Beamer. This is done from the menu command “Document>Settings>Document Class>Beamer”

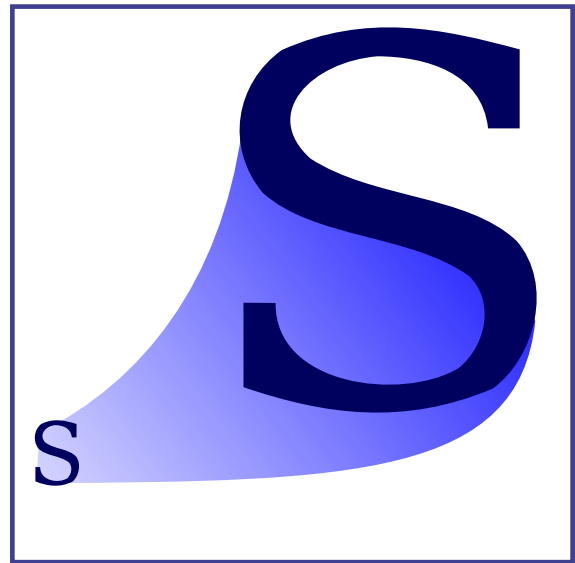
## 2 Vector Graphics using Inkscape

### Raster vs Vector Graphics



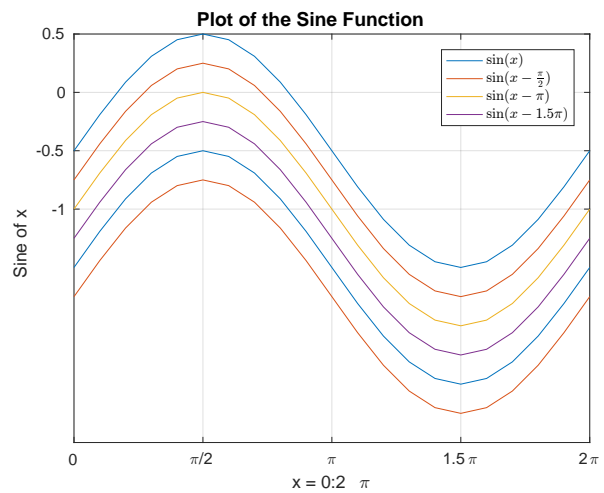
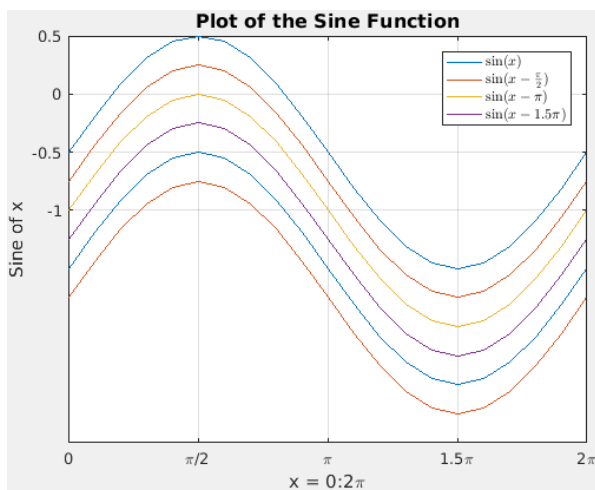
# Raster

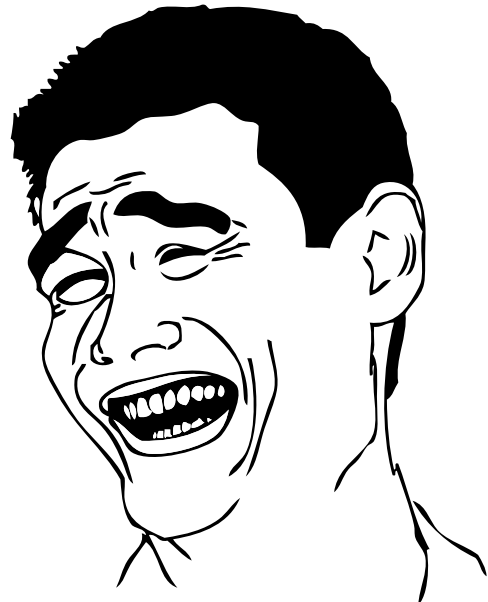
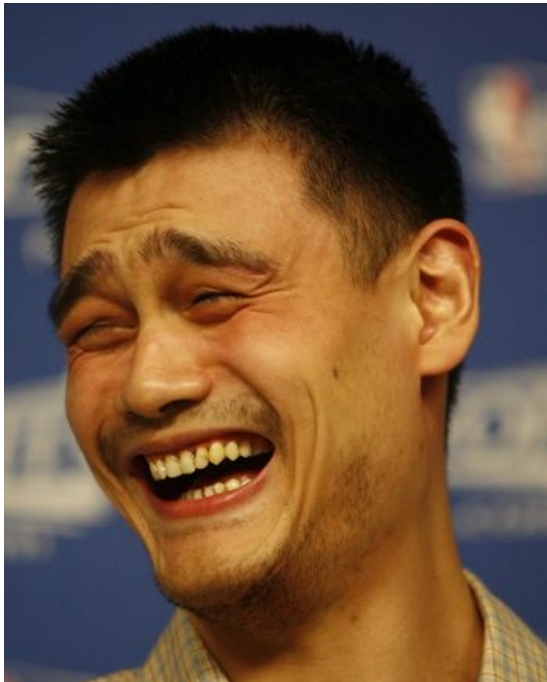
.bmp .jpeg .png



# Vector

.emf .svg .pdf .eps





## Graphics Formats

Raster		Vector	
.bmp	Uncompressed	.pdf	Compressed
.png	Loose-less compression	.eps	
.jpg	Lossy compression	.emf	Compatible with MS office
		.svg	
⋮		⋮	



## Vector Graphics Editors

- |                                                                                                                                                                                             |                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Adobe Illustrator (<i>de facto</i> standard; bloated)</li><li>• Corel Draw (bloated)</li><li>• Inkscape (light, open source, free, cross-</li></ul> | <p>platform and popular; my favorite)</p> <ul style="list-style-type: none"><li>• LibreOffice Draw</li><li>• ...</li></ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|

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- Free
- Open source
- Cross platform
- Has a big community, i.e.,
  - it is mature enough
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution
- Much much powerful than MS-Word or MS-Power point sketching capabilities
- Has several plugins that greatly expand its capabilities

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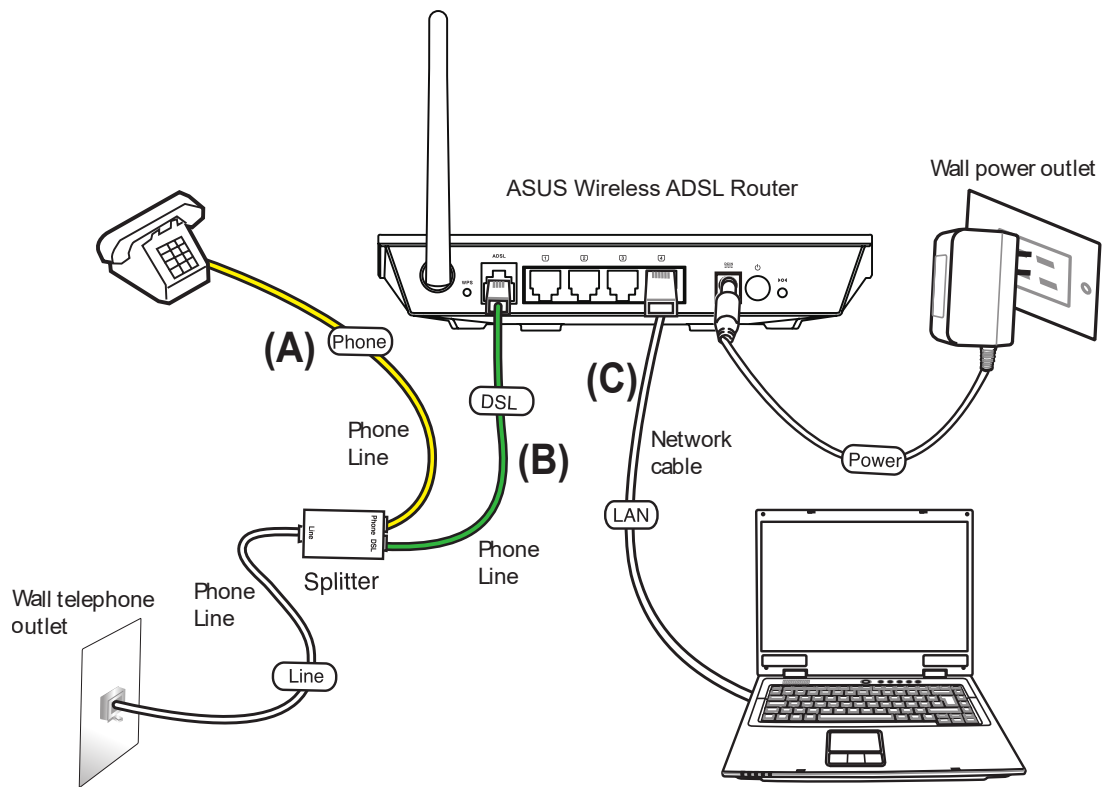
## Inkscape Capabilities

- Inkscape is based on brazier curves
  - Defines a curve using four information, start, end, start tangent and end tangent
- Additionally, you can draw and edit:

<ul style="list-style-type: none"><li>– straight lines</li><li>– circles/arcs/ellipses</li><li>– text</li></ul>	<ul style="list-style-type: none"><li>– <math>\text{\LaTeX}</math> formulas</li><li>– function curves</li><li>– ...</li></ul>
-----------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------

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## Import Graphics from pdf



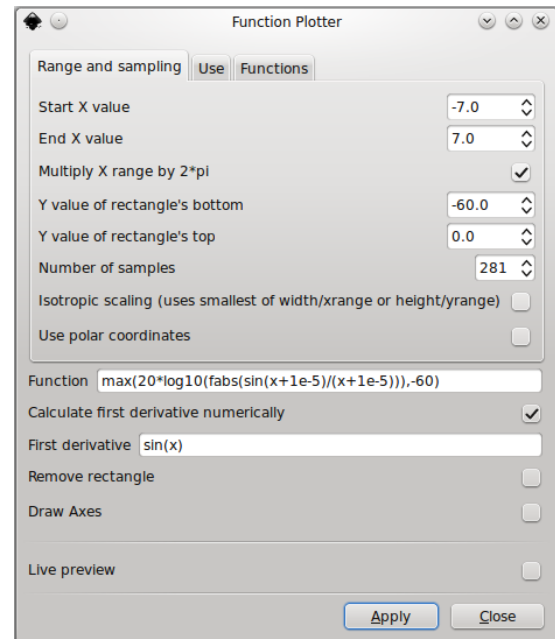
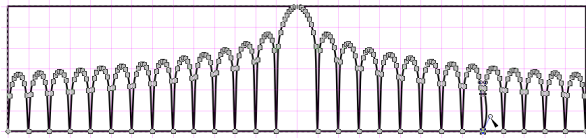
- You can import vector graphics from pdf files, and even edit them

## 2.1 Interesting Plug-ins

### Function Plotter

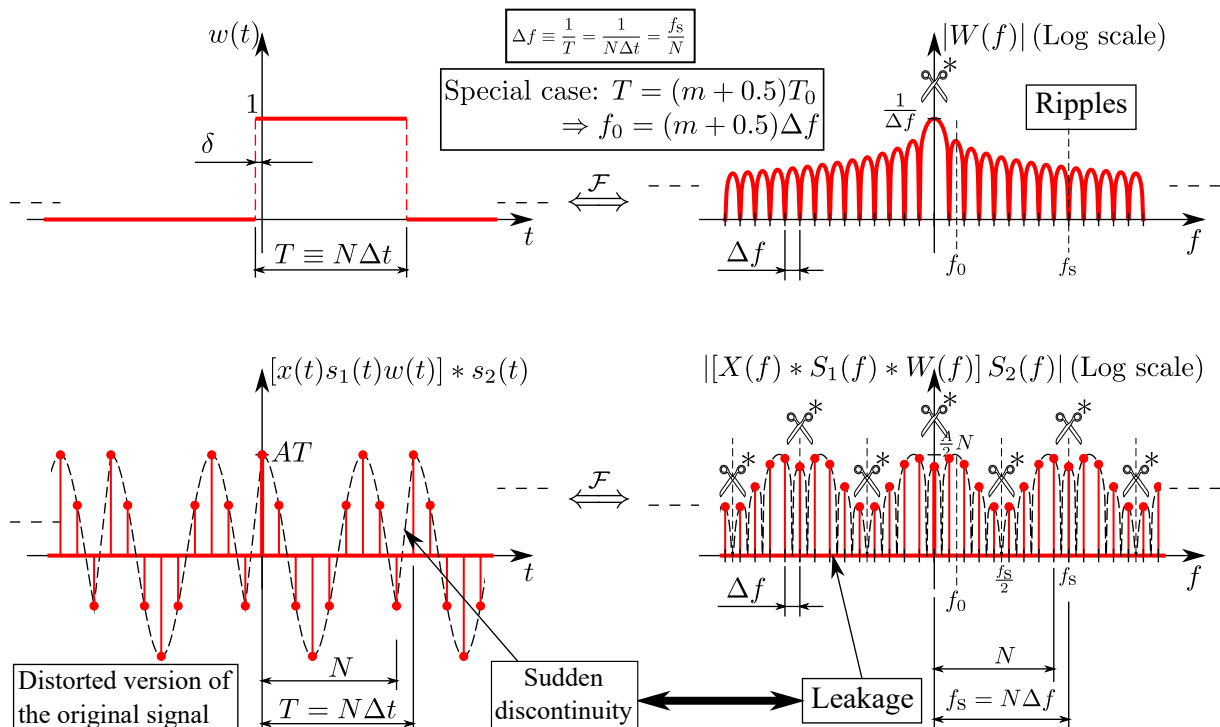
Function Plotter is a built in plugin.

- It uses Bézier curves, same as Inkscape
- It calculates the function derivative and use it to adjust the curve slope
  - It produces very smooth curves using much less points than Matlab
  - You can still modify the end/control points



### TeXText

It allows you to write/edit  $\text{\LaTeX}$  formulas inside Inkscape



## 2.2 Learning Inkscape

- **Explore** menus and toolbars

- **Official manual** [1] is very good and detailed
  - Chapters 1 includes 10 examples
    - \* The first 3 examples are enough for a good start
  - Chapters 5 explains editing
    - \* Surf it fast
- **Help menu** includes tutorials, FAQ, ...
- <http://inkscape.tutorials.org/>

## References

- [1] T. Bah, *Inkscape*. Prentice Hall, 2011. [Online]. Available: [http://www.ebook.de/de/product/14765413/tavmjong\\_bah\\_inkscape.html](http://www.ebook.de/de/product/14765413/tavmjong_bah_inkscape.html)