



A Brief Introduction to LaTeX

IDC 603A, 2018-19 , SEM - II
IIT KANPUR

What are TeX and LaTeX?

- LaTeX is a typesetting system suitable for producing scientific and mathematical documents.
 - LaTeX enables authors to typeset and print their work at the highest typographical quality.
 - LaTeX is pronounced “Lay-tech”.
 - LaTeX uses TeX formatter as its typesetting engine.
- TeX is a program written by Donald Knuth for typesetting text and mathematical formulas.

Why LaTeX ?

- Easy to use, especially for typing mathematical formulae
- Portability (Windows, Unix, Mac)
- Stability and interchangeability

Why LaTeX ? contd...

- High quality
- Most journals have their LaTeX styles.
- you will be forced to use it, since everyone else around you is using it.

Why LaTeX ? contd...

- Documentation and forums
- A universal acceptance among researchers
- Error finding and troubleshooting are not difficult.

Compact Mathematical Expressions in LaTeX

$$J[x(\cdot), u(\cdot)] = \int_{t_0}^{\infty} F(x(t), u(t), t) dt$$

$$\mathcal{J}[x(\cdot), u(\cdot)] = \int_{t_0}^{\infty} F(x(t), u(t), t) dt$$

References for LaTeX

- The not so short introduction to LaTeX2e
 - <http://tobi.oetiker.ch/lshort/lshort.pdf>
- Comprehensive TeX archive network
 - <http://www.ctan.org/>
- Beginning LaTeX
 - <http://www.cs.cornell.edu/Info/Misc/LaTeX-Tutorial/LaTeX-Home.html>
- Google! !

....Leslie Lamport

.....H. Kopka

Basic File Extensions in LaTeX

File Extensions	Significance
.tex	Contains symbols and text written in the editor
.aux	Data file for cross referencing and across compilers
.log	Compiler information, warnings, error messages
.dvi	Main output file of initial TeX, same across systems
.ps	Post script files
.cls	Class file containing commands, environments
.sty	Style file containing macro definitions, other extensions
.pdf	Common output format: Portability
.bib	bibliography entries
.bst	style file for generating the bibliography
.toc	stores the table of contents

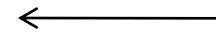
Basic File Extensions in LaTeX

File Extensions	Significance
.dtx	Documented source file
.fd	Font definition, used in generating the output.
.cbx:	A biblatex cite style
.blg	Bibliography (BibTeX) log -- just like .log but for BibTeX;
.bbl	Bibliography; this is output of BibTeX
.ilg	denotes a MakeIndex log file
.lof	An auxiliary file that stores the list of figures,
.lot	An auxiliary file that stores the list of tables
.ist	denotes a MakeIndex style file.
.ind	denotes a (La)TeX index file
.idx	denotes a <i>MakeIndex</i> index source file.

How to Setup LaTeX for Windows

- Download and install MikTeX

<http://www.miktex.org/>



LaTeX package

- Install Ghostscript and Gsview

<http://pages.cs.wisc.edu/~ghost/>



PS device driver ...

- Install Acrobat Reader

- Install Editor

- WinEdt

<http://www.winedt.com/>

- TexnicCenter

<http://www.texniccenter.org/>

- Emacs, vi, etc.

For MAC Users

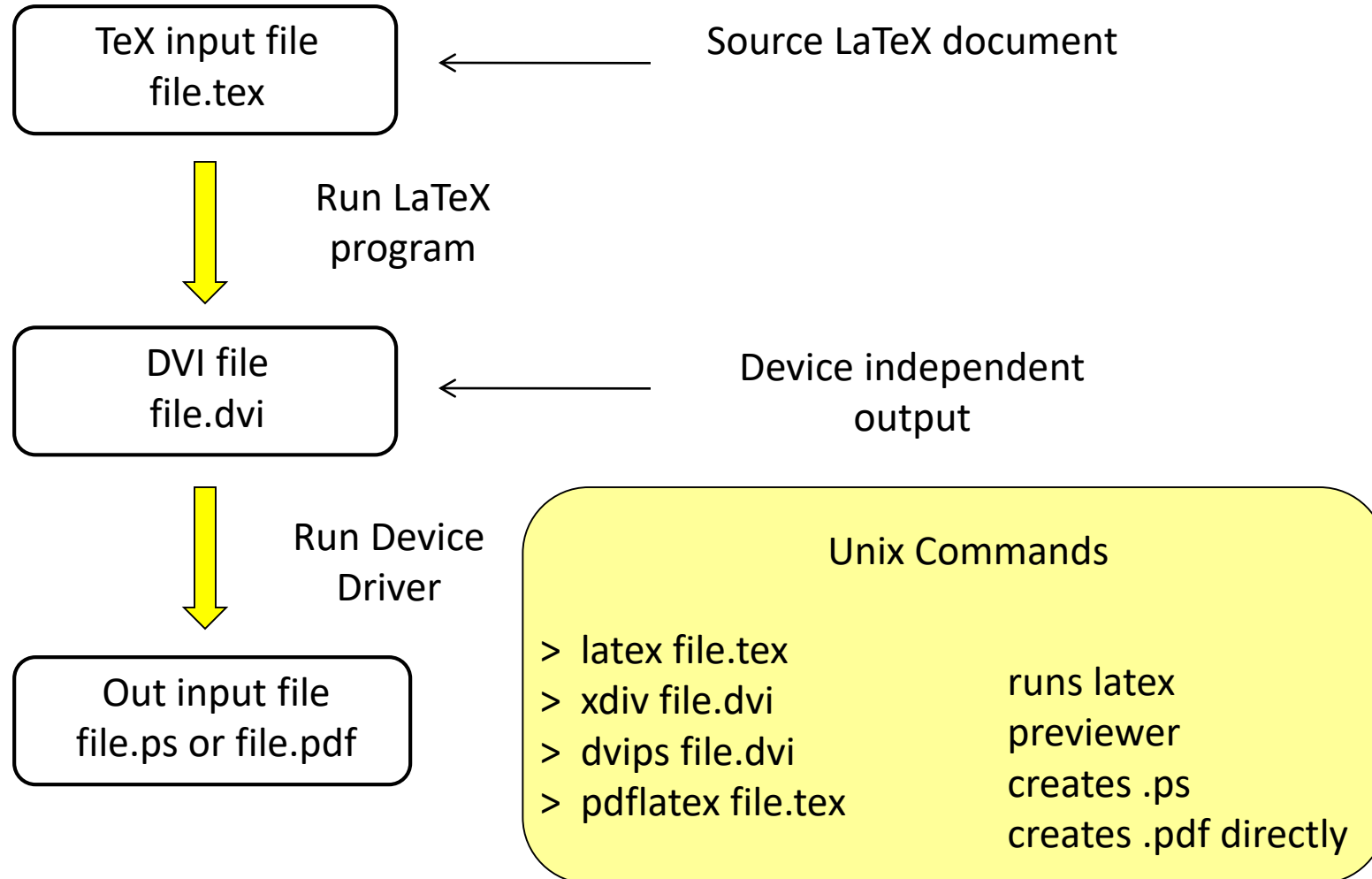
TeXShop

iTeXMac

Texmaker

...

Creating a Document Using LaTeX



Creating a Document Using LaTeX

- Start with a skeletal document (create it, get it from classmates, download it from journals' website....).
- Fill (text, formula, figure, table, text ...) the document.
- Run LaTeX to generate output and make modifications.
- Learn as you move. Code. Write.

LaTeX Document: Some Tips

- Use the tools for text formatting as need be : `\paragraph`, `\setlength`, `\linespread`.
- Commands start with `\`; spaces are allocated by the engine for `\`, `;` commands. Any in-text mathematical expression is embedded in '\$ \$' sign.
- `'%` is used for commenting and ignorable text.
- Commands take values called arguments: `\command{argument}[value]`. Varies the extent of the command with varying argument.

LaTeX Document: Some Useful Facts

- The preamble of the document contains all the necessary information for a fixed document type and code execution.
 - ❑ `\documentclass`, `\userpackage`, `\newcommand`, etc.
 - ❑ global declarations applicable to a particular document
 - ❑ External files: class files
 - ❑ text and content type
- LaTeX builds up its pages by pushing around boxes: `\mbox`, `\parbox`, `\fbox` , etc.
- Commands and texts enter together in ASCII file.
- Different text fonts (`\it`, `\bf`, `\rm`, `\sl` etc.)

Basic Structure of LaTeX Document

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

Define the types of the document
(article, book, thesis ...)

```
\usepackage {color}  
\usepackage {graphicx}
```

Preamble. Incorporate packages or
define macros here

```
\begin{document}
```

Main body, stuff to be printed, title,
authors, abstract, sections, references,

```
\end{document}
```

....

Title/Author Information and Document Structure

```
\begin{document}

\title {A Very Simple Introduction to LaTeX}

\author {names}

\thanks{AMS UCSC}
...
\maketitle

...

\section{Introduction}

\subsection{Subsection Heading Here}

\end{document}
```


Writing a Document in Latex

Example.tex

```
% This is an example.tex  
  
\documentclass {article}  
  
\begin {document}  
  
This is a test  
  
\end {document}
```

This is a test

Writing a Document in Latex

Section and subsection

Example.tex

```
% This is an example.tex  
  
\documentclass [12pt]{article}  
\begin {document}  
\title {This is an example}  
\author {James Bond}  
\maketitle  
  
\section {Introduction}  
\subsection {Experiment}  
  
\end {document}
```

This is an example

James Bond

September 19, 2005

1 Introduction

1.1 Experiment

- (1) latex Example.tex Example.dvi (2) dvips Example.dvi Example.ps
(3) ps2pdf Example.ps Example.pdf

Useful Symbols and Notations in Latex

`\greek = greek;` `\Greek = Greek`

Commands for mathematical symbols are often intuitive.

TABLE 327: Producing bold mathematical symbols

Package	Code	Output	
<i>none</i>	<code>\$\$\alpha + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	(no bold)
<i>none</i>	<code>\$\$\mathbf{\alpha + b = \Gamma \div D}\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	
<i>none</i>	<code>\boldmath\$\alpha + b = \Gamma \div D\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	
<i>amsbsy</i>	<code>\$\$\pmb{\alpha + b = \Gamma \div D}\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	(faked bold)
<i>amsbsy</i>	<code>\$\$\boldsymbol{\alpha + b = \Gamma \div D}\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	
<i>bm</i>	<code>\$\$\bm{\alpha + b = \Gamma \div D}\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	
<i>fixmath</i>	<code>\$\$\mathbfbold{\alpha + b = \Gamma \div D}\$</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	

Varied Symbols and Notations in Latex: a Sample List

L^AT_EX Mathematical Symbols

The more unusual symbols are not defined in base L^AT_EX (NFSS) and require `\usepackage{amsymb}`

1 Greek and Hebrew letters

α	<code>\alpha</code>	κ	<code>\kappaappa</code>	ϑ	<code>\vartheta</code>	ζ	<code>\zetaziggma</code>	Δ	<code>\Delta</code>	Θ	<code>\Theta</code>
β	<code>\beta</code>	λ	<code>\lambdambda</code>	ρ	<code>\rho</code>	ϵ	<code>\epsilonpsilon</code>	Γ	<code>\Gamma</code>	Υ	<code>\Upsilon</code>
γ	<code>\gamma</code>	μ	<code>\mu</code>	σ	<code>\sigma</code>	ϖ	<code>\varpi</code>	Λ	<code>\Lambda</code>	Ξ	<code>\Xi</code>
δ	<code>\delta</code>	ν	<code>\nu</code>	τ	<code>\tau</code>	φ	<code>\varphiphi</code>	Ω	<code>\Omega</code>	\aleph	<code>\aleph</code>
ϵ	<code>\epsilonpsilon</code>	ξ	<code>\xi</code>	θ	<code>\theta</code>	ϖ	<code>\varpi</code>	ϕ	<code>\phi</code>	\beth	<code>\beth</code>
η	<code>\eta</code>	\omicron	<code>\omicron</code>	ϑ	<code>\vartheta</code>	ϱ	<code>\varrho</code>	ψ	<code>\psi</code>	\aleph	<code>\aleph</code>
ζ	<code>\zetaziggma</code>	ϖ	<code>\varpi</code>	ς	<code>\varsigma</code>	ϱ	<code>\varrho</code>	Φ	<code>\Phi</code>	\daleth	<code>\daleth</code>
η	<code>\eta</code>	ϖ	<code>\varpi</code>	ζ	<code>\zeta</code>	ϑ	<code>\vartheta</code>	Σ	<code>\Sigma</code>	\beth	<code>\beth</code>
θ	<code>\theta</code>	ϖ	<code>\varpi</code>	ζ	<code>\zeta</code>	ϑ	<code>\vartheta</code>				

2 L^AT_EX math constructs

$\frac{abc}{def}$	<code>\frac{abc}{def}</code>	\overline{abc}	<code>\overline{abc}</code>	\overleftrightarrow{abc}	<code>\overleftrightarrow{abc}</code>
f^e	<code>\f^e</code>	\underline{abc}	<code>\underline{abc}</code>	\overleftarrow{abc}	<code>\overleftarrow{abc}</code>
$\sqrt[n]{abc}$	<code>\sqrt[n]{abc}</code>	\overbrace{abc}	<code>\overbrace{abc}</code>	\overbrace{abc}	<code>\overbrace{abc}</code>
$\sqrt[n]{abc}$	<code>\sqrt[n]{abc}</code>	\underbrace{abc}	<code>\underbrace{abc}</code>	\underbrace{abc}	<code>\underbrace{abc}</code>

3 Delimiters

$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$	$\left\{ \begin{array}{l} \text{left} \\ \text{right} \end{array} \right.$
<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>
<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>	<code>\left</code>	<code>\right</code>

Use the pair `\left1` and `\right2` to match height of delimiters s_1 and s_2 to the height of their contents, e.g., `\left1{...}\right2`, `\left1{...}\right2`, `\left1{...}\right2`.

4 Variable-sized symbols (displayed formulae show larger version)

\sum	<code>\sum</code>	\prod	<code>\prod</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>
\prod	<code>\prod</code>	\prod	<code>\prod</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>
\prod	<code>\prod</code>	\prod	<code>\prod</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>	\int	<code>\int</code>

5 Standard Function Names

Function names should appear in Roman, not Italic, e.g.,

<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>	<code>\arcsin</code>
<code>\cos</code>	<code>\cos</code>	<code>\cosh</code>	<code>\cosh</code>	<code>\cot</code>	<code>\cot</code>	<code>\csc</code>	<code>\csc</code>
<code>\exp</code>	<code>\exp</code>	<code>\exp</code>	<code>\exp</code>	<code>\det</code>	<code>\det</code>	<code>\dim</code>	<code>\dim</code>
<code>\log</code>	<code>\log</code>	<code>\log</code>	<code>\log</code>	<code>\hom</code>	<code>\hom</code>	<code>\inf</code>	<code>\inf</code>
<code>\lim sup</code>	<code>\lim sup</code>	<code>\lim</code>	<code>\lim</code>	<code>\lim</code>	<code>\lim</code>	<code>\lim inf</code>	<code>\lim inf</code>
<code>\min</code>	<code>\min</code>	<code>\Pr</code>	<code>\Pr</code>	<code>\sec</code>	<code>\sec</code>	<code>\sin</code>	<code>\sin</code>
<code>\sinh</code>	<code>\sinh</code>	<code>\sup</code>	<code>\sup</code>	<code>\tan</code>	<code>\tan</code>	<code>\tanh</code>	<code>\tanh</code>

Online Library: LaTeX Symbols

- <https://tex.stackexchange.com/> (Discussion forum)
- https://en.wikipedia.org/wiki/Wikipedia:LaTeX_symbols
- http://latex.wikia.com/wiki/List_of_LaTeX_symbols
- https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols
- <http://www.ctan.org/>
- <http://artofproblemsolving.com/wiki/index.php?title=LaTeX:Symbols>

How to Input Math Formulas

- Use `\(... \)` for in-line and `\[... \]` for displaying math formulas.
- Spaces inside `\(... \)` and `\[... \]` are ignored. If needed, use `\` to add space.
- Use `\mbox{...}` for words inside math formulas.

Standard Environments: Theorem; Equation. Etc.

```
\begin{env_name}  
  detail  
\end{env_name}
```

Environment name (env_name) can be
document, itemize, enumerate, tabular, etc.

```
\begin{itemize}  
  \item The first item  
  \item The second item  
\end{itemize}
```



- The first item
- The second item

Cross Referencing

LaTeX generates numbers for Theorem, Equation, Section, Figure and other environments automatically. Access them with `\label` and `\ref`

```
\section{Introduction} \label{sec:intro}
```

....

```
In Section \ref{sec:intro}
```


Writing a Document in Latex

`\userpackages`

`\newcommands`

Install packages on the fly as need be.

Special packages are available for neat description of elegant mathematics and algorithms.

Use multicolumn for lengthy equations and install the requisite packages.

Journal class files use specific packages and provides less trouble while compilation.

LaTeX does not provide a command or environment that matches the criteria.

Output produced by existing command may not meet requirements.

Macros

```
\newcommand{name}[Num]{Definition}
```

A new definition for mod sign in the preamble:

```
\newcommand\norm[1]{\left\|Vert#1\right\|}
```

Writing a Document in Latex

`\usepackages`

`\usepackage{graphicx}`

Images and artwork

`\usepackage{epstopdf}`

eps – pdf conversion

`\usepackage{subfigure}`

Grouping of figures

`\usepackage{comment}`

Comments and margins

`\usepackage{amsmath}`

Mathematical symbol and environments

`\usepackage{amssymb}`

do

`\usepackage{algorithm2e}`

Environments for algorithms

`\usepackage{algorithmicx}`

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}
```

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1 Introduction

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

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\left(\frac{t-p_n}{s_n}\right) \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

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

(1)

Writing a Document in Latex

Images

Insert figures in pdf, jpg, eps, and other formats into the document.

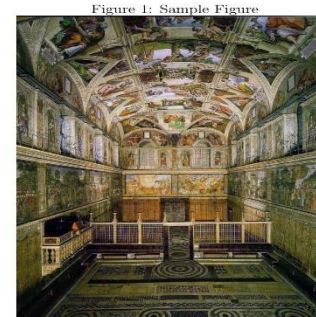
Separate packages to handle graphics need to be installed.

```
\begin{figure}  
  \centering  
  \includegraphics {name of the figure file}  
  \caption{Put the caption here}  
\end{figure}
```

Writing a Document in Latex

Figures

```
Example.tex  
  
% This is an example.tex  
  
\documentclass [12pt]{article}  
\usepackage {graphicx}  
\begin {document}  
  
\begin {figure}  
\centering  
\includegraphics[width=0.80\textwidth]  
{Sistina-interno}  
\caption {Sample Figure}  
\label {fig1}  
\end {figure}  
  
\end {document}
```



Writing a Document in Latex

Figures

Example.tex

```
% This is an example.tex
```

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

```
\usepackage {epsfig, graphicx}
```

```
\begin {document}
```

```
\begin {figure}
```

```
\epsfxsize =6.5in
```

```
\centerline {Sistina-interno.jpg}
```

```
\end {figure}
```

```
\end {document}
```



Writing a Document in Latex

Notes on images

A float object: Latex is opportunist unless the author forces it `{!htb}`.

Use `\subfigure` package for grouping of pictures.

Exercise caution for graphics inclusion about general formatting of the text.

`.jpg` and `.eps` serve better than most.

Adhere to the artwork guideline of the journal.

Writing a Document in Latex

Tables

Example.tex

```
% 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

Writing a Document in Latex

References within a document

Example.tex

```
% 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}
```

1 Introduction

This is section on Introduction.

1.1 experiment

This is an example subsection. Please refer Section.1 for introduction. Refer

Section. 1.1

Very easy to manage all the references in long documents

Writing a Document in Latex

Citing other works

Example.tex

```
% 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

References and Citations

The `\thebibliography` environment produces a bibliography or reference list. In the article style, this reference list is as labeled "References"; in the report style, it is labeled as "Bibliography".

```
\begin{thebibliography} {widest-label}
```

```
\bibitem[label]{cite_key}
```

```
...
```

```
\end{thebibliography}
```

`widest-label`: Text that, when printed, is approximately as wide as the widest item label produces by the `\bibitem` commands.

Reference and Citation

For 10 and 99 publications, start with `\begin{thebibliography}[99]`. Use any two digit number in the argument, since all numerals are of the same width.

References

- [1] H. Kopka and P. W. Daly, *A Guide to L^AT_EX*, 3rd ed., Harlow, England: Addison-Wesley, 1999.
- [2] L. Lamport, “L^AT_EX : a document preparation system”, 2nd edition (updated for L^AT_EX2e), Addison-Wesley, 1994.

For customized labels, put the longest label in argument, i.e., type `\begin{thebibliography}[Longest-name]`

References

- [Kopka 1999] H. Kopka and P. W. Daly, *A Guide to L^AT_EX*, 3rd ed., Harlow, England: Addison-Wesley, 1999.
- [Lamport 1994] L. Lamport, “L^AT_EX : a document preparation system”, 2nd edition (updated for L^AT_EX2e), Addison-Wesley 1994.

Reference and Citation

```
\begin{thebibliography} {widest-label}

  \bibitem[label]{cite_key}
  ...
\end{thebibliography}
```

- `cite_key` is used to cite publications inside the document.
- To cite a publication from the reference list, use the `\cite` command.
- The argument to `\cite` may be one key, or two or more keys, separated by commas.

One can use the bibTeX package to generate reference list.

Example Document From an IEEE Journal

To write a paper for conferences/journals/transactions:

- Download LaTeX template from IEEE (or from the specific journal website).

<http://www.ieee.org/web/publications/authors/transjnl/index.html>

- Open example LaTeX file (bare_jrnl.tex) and modify it.

- No need to worry about things like margin, font, ...

```
\documentclass[journal]{IEEEtran}

\usepackage{graphicx}
\usepackage[cmex10]{amsmath}
\usepackage{algorithmic}
\usepackage{array}
\usepackage[tight,footnotesize]{subfigure}

\begin{document}

\title{Bare Demo of IEEEtran.cls for Journals}

\author{Michael~Shell,~\IEEEmembership{Member,~IEEE,}
John~Doe,~\IEEEmembership{Fellow,~OSA,}
and~Jane~Doe,~\IEEEmembership{Life~Fellow,~IEEE}}% <-this % stops a
space
\thanks{M. Shell is with the Department
of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta,
GA, 30332 USA e-mail: (see http://www.michaelshell.org/contact.html).}% <-this %
stops a space
\thanks{J. Doe and J. Doe are with Anonymous University.}% <-this % stops a space
\thanks{Manuscript received April 19, 2005; revised January 11, 2007.}}

% The paper headers
\markboth{Journal of \LaTeX\ Class Files,~Vol.~6, No.~1, January~2007}%
{Shell \MakeLowercase{\textit{et al.}}: Bare Demo of IEEEtran.cls for Journals}

% make the title area
\maketitle

\begin{abstract}
The abstract goes here.
\end{abstract}

\begin{IEEEkeywords}
IEEEtran, journal, \LaTeX, paper, template.
\end{IEEEkeywords}

\section{Introduction}

\IEEEPARstart{T}{his} demo file is intended to serve as a "starter file"
for IEEE journal papers produced under \LaTeX\ using
IEEEtran.cls version 1.7 and later. I wish you the best of success.
```

bare_jrnl.tex

Questions!