

# Introduction to $\LaTeX$

## How to get started

Alireza Sheikh, Yasaman Ettefagh, Nima Hajiabdolrahim

ettefagh@chalmers.se  
nimahaj@chalmers.se

Dept. of Signals and Systems

Chalmers University of Technology

Jan. 23, 2020



**CHALMERS**

# Overleaf

- Overleaf is an online  $\text{\LaTeX}$  based plain text and Rich Text real time collaborative writing and publishing tool. [▶ Link1](#)

Lets try

## IEEE journal template

- Download the IEEE journal template from the following link:
- Open the "bare-jrnl.tex".

[▶ Link](#)

## IEEE journal template

- Download the IEEE journal template from the following link: [▶ Link](#)
- Open the "bare-jrnl.tex".

### Hint

- Some of the characters in Latex are reserved! Each command begins with "`\`". If you need "`\`" you should type `\textbackslash`. In the following link, you can find the code of some useful characters. [▶ Link](#)
- The line started with "`%`" symbol is interpreted as a comment line.
- **Do not underestimate the power of Google.**

## IEEE journal template

- Download the IEEE journal template from the following link: [▶ Link](#)
- Open the "bare-jrnl.tex".

### Hint

- Some of the characters in Latex are reserved! Each command begins with "\". If you need "\" you should type `\textbackslash`. In the following link, you can find the code of some useful characters. [▶ Link](#)
- The line started with "%" symbol is interpreted as a comment line.
- **Do not underestimate the power of Google.**

### `\documentclass`

- Specifies the type of the document, one column, two column, ...
- Use `\documentclass[journal]{IEEEtran}`

## IEEE journal template

- Download the IEEE journal template from the following link: [▶ Link](#)
- Open the "bare-jrnl.tex".

### Hint

- Some of the characters in Latex are reserved! Each command begins with "\". If you need "\" you should type `\textbackslash`. In the following link, you can find the code of some useful characters. [▶ Link](#)
- The line started with "%" symbol is interpreted as a comment line.
- **Do not underestimate the power of Google.**

### `\documentclass`

- Specifies the type of the document, one column, two column, ...
- Use `\documentclass[journal]{IEEEtran}`

### `\begin{document}` and `\end{document}`

- Includes the whole code.

## Elements of the Template

### Paper heading and abstract

- `\author{...}` : Use "~" character to prevent folding two words.
- `\thanks{...}` : Adds some notes.
- `\maketitle` : Creates the title with information given using `\author`, `\thanks` and `\title`.
- `\begin{abstract} .... \end{abstract}`: Write your abstract here.
- `\begin{IEEEkeywords} .... \end{IEEEkeywords}`: Write some index keys.

# Elements of the Template

## Paper body

- `\section{...}` : Adds new sections.
  - `\subsection{...}`: A, B, ...
  - `\subsubsection{...}`: 1), 2), ...
- `\\(+ Enter)` : Makes a new line (new paragraph).
- `\vspace{...}`: Adjusts the vertical space manually.
- `\appendices + \section{...}`: Adds a new appendix.
- `\label{name}`: Use to refer to any sections, formulas, etc. Use `\ref{name}` for referring. It should appear right after the definition of the command.



# Lists

## Enumerate (numbered lists)

- `\begin{enumerate} \item name \end{enumerate}`

# Lists

## Enumerate (numbered lists)

- `\begin{enumerate} \item name \end{enumerate}`

## Itemize (bulleted lists)

- `\begin{itemize} \item name \end{itemize}`

# Lists

## Enumerate (numbered lists)

- `\begin{enumerate} \item name \end{enumerate}`

## Itemize (bulleted lists)

- `\begin{itemize} \item name \end{itemize}`

## Description (lists started by a descriptor)

- `\begin{description} \item name \end{description}`

# Lists

## Enumerate (numbered lists)

- `\begin{enumerate} \item name \end{enumerate}`

## Itemize (bulleted lists)

- `\begin{itemize} \item name \end{itemize}`

## Description (lists started by a descriptor)

- `\begin{description} \item name \end{description}`

Lets try

## Math environment

- Add `\usepackage{amsmath}` after `\documentclass` and before `\begin{document}`. All packages follow the same rule.
- Some useful links for math symbols. [▶ Link1](#) [▶ Link2](#) [▶ Link3](#)
- One of the useful softwares is "MathType". It is more user friendly.  
Trial version: [▶ Link](#)

## Math environment

- Add `\usepackage{amsmath}` after `\documentclass` and before `\begin{document}`. All packages follow the same rule.
- Some useful links for math symbols. [▶ Link1](#) [▶ Link2](#) [▶ Link3](#)
- One of the useful softwares is "MathType". It is more user friendly.  
Trial version: [▶ Link](#)

### Math inside the text

- If you want to add a mathematical expression in the text, you should use `$...$`. Ex:  $z = x \times y$   $\longrightarrow$  `$z = x \times y$`

## Math environment

- Add `\usepackage{amsmath}` after `\documentclass` and before `\begin{document}`. All packages follow the same rule.
- Some useful links for math symbols. [▶ Link1](#) [▶ Link2](#) [▶ Link3](#)
- One of the useful softwares is "MathType". It is more user friendly.  
Trial version: [▶ Link](#)

### Math inside the text

- If you want to add a mathematical expression in the text, you should use `$...$`. Ex:  $z = x \times y$   $\longrightarrow$  `$z = x \backslash times y $`

Lets try

# Math environment

## Math outside the text

- Use `\begin{align}...\end{align}` or `\begin{equation}...\end{equation}`. It allocates a new line for the equation.
- Use `\begin{align*}...\end{align*}` if you do not need numbering.
- If you need to align some part of equation use the following method:
  - Find the initial point of alignment and put "&" symbol.
  - Find the followed point of alignment and put "\\ \nonumber &"
  - **Easier to see an example :-)**
- Some useful notes on typesetting math equation in "How to Typeset Equations in L<sup>A</sup>T<sub>E</sub>X" by Stephan M. Moser. [▶ Link](#)



# Math environment

## Math outside the text

- Use `\begin{align}...\end{align}` or `\begin{equation}...\end{equation}`. It allocates a new line for the equation.
- Use `\begin{align*}...\end{align*}` if you do not need numbering.
- If you need to align some part of equation use the following method:
  - Find the initial point of alignment and put "&" symbol.
  - Find the followed point of alignment and put "\\ \nonumber &"
  - **Easier to see an example :-)**
- Some useful notes on typesetting math equation in "How to Typeset Equations in  $\text{\LaTeX}$ " by Stephan M. Moser. [▶ Link](#)

Lets try

## Tables

- The described table should be in `\begin{table} ..... \end{table}`.

## Tables

- The described table should be in `\begin{table} ..... \end{table}`.

### Tabular command

- Structure:
  - `\caption{....}`
  - `\label{....}`
  - `\begin{tabular}{col1(r or c or l)|(vertical line) col2(r or c or l) ...}`
  - `(1,1) & (1,2) ... \\`
  - `\hline` (horizontal line)
  - .
  - .
  - .
  - `\end{tabular}`
- More information: [▶ Link](#)
- Information on float specifier: [▶ Link](#)

## Tables

- The described table should be in `\begin{table} ..... \end{table}`.

### Tabular command

- Structure:
  - `\caption{....}`
  - `\label{....}`
  - `\begin{tabular}{col1(r or c or l)|(vertical line) col2(r or c or l) ...}`
  - `(1,1) & (1,2) ... \\`
  - `\hline` (horizontal line)
  - .
  - .
  - .
  - `\end{tabular}`
- More information: [▶ Link](#)
- Information on float specifier: [▶ Link](#)

Lets try

# Graphics

- Add `\usepackage{graphicx}`.
- The intended file needs to be in the same directory as the main.tex file is.

# Graphics

- Add `\usepackage{graphicx}`.
- The intended file needs to be in the same directory as the main.tex file is.

## `\includegraphics{...}` command

- General form:  
`\includegraphics[width=...,height=...,scale=...,angle=...]{file name}`
  - height, scale, angle= number
  - width=number, `\linewidth`
- Put the figure description inside the `\caption{...}` command.

# Graphics

- Add `\usepackage{graphicx}`.
- The intended file needs to be in the same directory as the main.tex file is.

## `\includegraphics{...}` command

- General form:  
`\includegraphics[width=...,height=...,scale=...,angle=...]{file name}`
  - height, scale, angle= number
  - width=number, `\linewidth`
- Put the figure description inside the `\caption{...}` command.
- `\begin{figure}\includegraphics{...}\caption{...}\label{...}\end{figure}`.

# Graphics

- Add `\usepackage{graphicx}`.
- The intended file needs to be in the same directory as the main.tex file is.

## `\includegraphics{...}` command

- General form:  
`\includegraphics[width=...,height=...,scale=...,angle=...]{file name}`
  - height, scale, angle= number
  - width=number, `\linewidth`
- Put the figure description inside the `\caption{...}` command.
- `\begin{figure}\includegraphics{...}\caption{...}\label{...}\end{figure}`.

Lets try



## Bibliography

- A .bib file is generated containing the bibliography of the intended papers in BiBtex format. Then, this file is called in the main code.

## Bibliography

- A .bib file is generated containing the bibliography of the intended papers in BiBtex format. Then, this file is called in the main code.

### How to generate the .bib file?

- Open a new file in your editor.
- Copy the Bibtex bibliography in your file and save it with .bib suffix.

## Bibliography

- A .bib file is generated containing the bibliography of the intended papers in BibTeX format. Then, this file is called in the main code.

### How to generate the .bib file?

- Open a new file in your editor.
- Copy the BibTeX bibliography in your file and save it with .bib suffix.

### What is the BibTeX bibliography?

- A format contains the information of the paper. E.g. journals: @Article{...}, conferences: @inproceedings{...}, etc. E.g.  
@BOOK{< some abbreviation that you make up >,  
AUTHOR = "author",  
TITLE = "book title",  
PUBLISHER = {publishing company},  
ADDRESS = {where published},  
YEAR = {year published}  
More inf. see [▶ Link](#)

# Bibliography

- Bibtex format can be downloaded in IEEExplore or Google scholar [▶ Link1](#)

# Bibliography

- Bibtex format can be downloaded in IEEExplore or Google scholar [▶ Link1](#)

## How to call .bib file?

- Add the following code to the end of the code before `\end{document}`:  
`\bibliographystyle{IEEEtran}`  
`\bibliography{IEEEabrv, .bib file}`
- Refer to the reference wherever you want with the following code:  
`\cite{some abbreviation that you make up}`

# Bibliography

- Bibtex format can be downloaded in IEEEExplore or Google scholar [▶ Link1](#)

## How to call .bib file?

- Add the following code to the end of the code before `\end{document}`:  
`\bibliographystyle{IEEEtran}`  
`\bibliography{IEEEabrv, .bib file}`
- Refer to the reference wherever you want with the following code:  
`\cite{some abbreviation that you make up}`

Lets try