How to LaTeX

Quick Tutorial for Beginners

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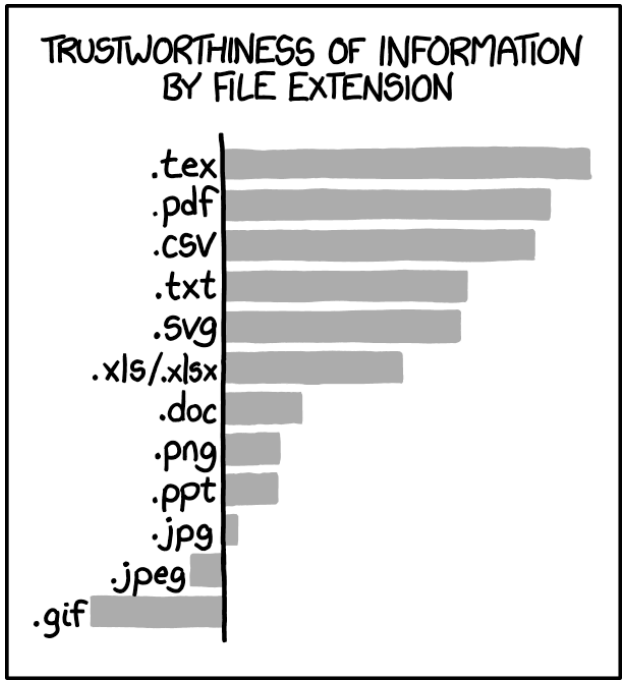
What is LaTeX?

- LaTeX is a typesetting system that is widely used by the scientific community.

- Advantages of using LaTeX:
  - Mathematical notation
  - Cross-referencing + automatic numbering
  - Easy formatting
  - Bibliography support
  - etc.



https://xkcd.com/1301/

Where to start?

1. Download and install a LaTeX implementation.

2. Download and install a LaTeX editor (in case you don't want to use the command window for compiling your documents).

Personal recommendation

1. Install the LaTeX implementation from MikTeX project: https://miktex.org/ .

2. Install Texmaker as editor: https://www.xm1math.net/texmaker/ .

   → **Note the following examples are all shown in Texmaker.**

Document Structure

```
\documentclass[a4paper,12pt]{article}

\usepackage{amsfonts}
\usepackage{amsmath}
\usepackage{graphicx}

\begin{document}



\end{document}
```

Every LaTeX document starts with **\documentclass[** *options* **]{** *document class* **}**.

The section before \begin{document} is known as the preamble. Everything written in here will affect the whole document. Packages that enhance LaTeX functionality are activated here using **\usepackage{** *package name* **}**.

The text and commands that form the document are enclosed by **\begin{document}** and **\end{document}.**

Sections

- Dividing a document in sections, subsection, sub-subsection, etc. is just a matter of writing the corresponding command.

```
\begin{document}

\section{Section Example}\label{sec.}

\subsection{Subsection Example}\label{subsec.}

\subsubsection{Sub-subsection Example}\label{subsubsec.}

\end{document}
```

1 Section Example

1.1 Subsection Example

1.1.1 Sub-subsection Example

- Labeling the sections (as well as equation, figures, tables, etc.) simplifies the use of cross-references.

```
Example of cross referencing Section~\ref{sec.},
Subsection~\ref{subsec.}, and Sub-subsection~
\ref{subsubsec.}
```

Example of cross referencing Section 1, Subsection 1.1, and Sub-subsection 1.1.1

Text and Math Mode

- Everything typed within the document will be displayed as “normal” text.

```
\begin{document}

LaTeX is really useful for writing in mathematical notation

\end{document}
```

LaTeX is really useful for writing in mathematical notation

- To write in mathematical notation you have first to enter math mode by typing $ $. Everything written in-between the dollar signs will be in math mode.

```
\begin{document}

$e^{\pi \cdot i} + 1 = 0 $

\end{document}
```

$$e^{\pi \cdot i} + 1 = 0$$

Text Formatting

- Formatting text consists in typing between the commands that define where the new format starts and ends.

```
\begin{document}

This is \textbf{bold-faced} text

This is \textit{italicized} text

This is \begin{large} large \end{large} text

This is \begin{huge} huge \end{huge} text

\end{document}
```

This is **bold-faced** text
This is *italicized* text
This is large text
This is huge text

Lists

- Unordered and ordered lists are created in LaTeX using the following commands.

```
\begin{document}
\begin{itemize}
\item Item 1
\item Item 2
\end{itemize}
\end{document}
```

- Item 1
- Item 2

```
\begin{document}
\begin{enumerate}
\item Item 1
\item Item 2
\end{enumerate}
\end{document}
```

1. Item 1
2. Item 2

Equations

- To write an equation we just need to define where the equation environment starts and ends.
- Everything written within the equation environment is automatically set to math mode.

```
\begin{document}

This is Equation~\ref{myEquation}:
\begin{equation}\label{myEquation}
a = 1+b
\end{equation}

\end{document}
```

This is Equation 1:

$$a = 1 + b \tag{1}$$

Tables

- Tables can be easily written within LaTeX. This simplifies their formatting and cross referencing within documents.
- Simple tables are written with the tabular command within the table environment.

```
\begin{document}

This is Table~\ref{tab.helloTable}:
\begin{table}[!hbt]
\centering
\begin{tabular}{l|c|c}
& Value 1 & Value 2  \\ \hline
Sample 1 & 1.2 & 3 \\
Sample 2 & 5& 6  \\
\end{tabular}
\caption{Hello Table}
\label{tab.helloTable}
\end{table}
\end{document}
```

This is Table 1:

	Value 1	Value 2
Sample 1	1.2	3
Sample 2	5	6

Table 1: Hello Table

- The position of the table above is given by the **\centering** command and by the options within the square brackets.

Figures

- Importing figures consists in defining, within the figure environment, the figure's path, size, position, caption, and label.

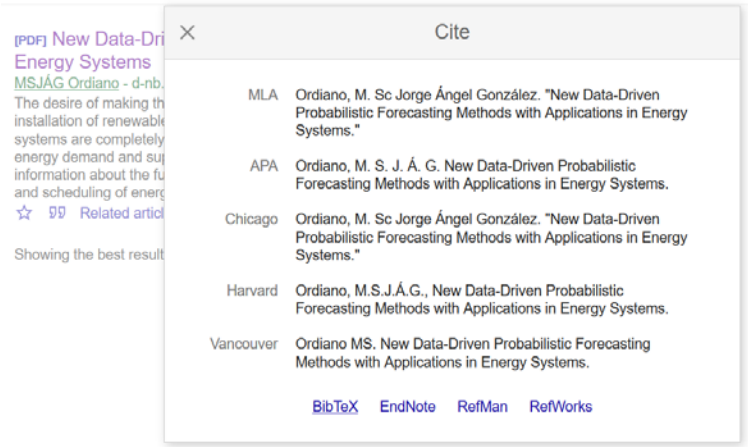
```
\usepackage{graphicx}

\begin{document}

This is Figure~\ref{fig.hellofigure}:
\begin{figure}[!hbt]
\centering
\includegraphics[width=.9\textwidth]{figure.pdf}
\caption{Hello Figure}
\label{fig.hellofigure}
\end{figure}

\end{document}
```

This is Figure 1:

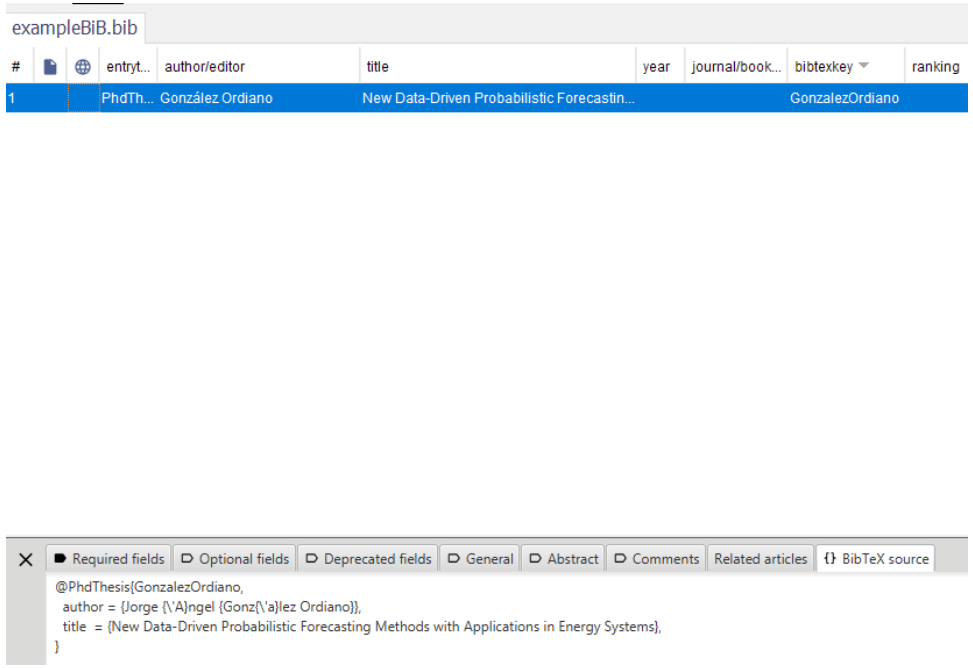
Figure 1: Hello Figure

References (1)

- The reference management software BiBTeX makes citing in LaTeX straightforward.
- The main advantage is that the bibliographic information (contained inside a .bib file) is separated from its presentation within a document.
- BiBTeX databases (such as JabRef) simplify the managing of references.




```
@article{ordianonew,
  title={New Data-Driven
Probabilistic Forecasting Methods
with Applications in Energy
Systems},
  author={Ordiano, M Sc Jorge
{\'A}ngel Gonz{\'a}lez}
}
```



References (2)

- Prior to citing our reference we need to add our .bib file to latex: **\bibliography{** *.bib file Name* **}**.
- The reference format is defined as: **\bibliographystyle{** *style* **}**.
- Citing a paper in LaTeX only requires us to know the bibtexkey that identifies the reference we want.
- Writing the **\cite{** *bibtexkey* **}** command adds the reference assigned to that bibtexkey to our document.

```
\begin{document}

This is my reference~\cite{GonzalezOrdiano}

\bibliographystyle{plain}
\bibliography{exampleBiB}

\end{document}
```

This is my reference [1]

References

[1] Jorge Ángel González Ordiano. *New Data-Driven Probabilistic Forecasting Methods with Applications in Energy Systems*. PhD thesis.

Final Advice

- If you have any question about how to do something in LaTeX just **google it**, chances are someone has already found an answer to your question.

- There are many useful website to get help with various aspects of writing in LaTeX. For example, If you don't know how to write a symbol just go to: http://detexify.kirelabs.org/classify.html .

- If you want to write an article in collaboration, use **GitHub** or tools like **Overleaf**.

- Finally and most importantly, **LaTeX is easier than it looks**.