

A short crash intro to LaTeX

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Outline:

1. Motivation and objectives
2. The structure of a LaTeX document
3. The challenge

1. Introduction :

Communication is of utmost importance in science (but not only in science)



Throughout your studies and your professional career, you will have to produce documents, give oral presentations or poster presentations

LaTeX is a text editor that is particularly well suited for producing scientific documents

It allows you to produce documents of multiple formats that contain formulas, tables, graphs, with professional typesetting quality

LaTeX is free

You may use LaTeX to write articles, your thesis, books, but also to write slides or to make a poster

The objective of this afternoon session is to give you a few basic elements to help you get started with LaTeX as you will have to write reports, give presentations during your internships,...

- the basic notions
- an exercise

The objective is to give you enough information so that you can start experimenting LaTeX by yourself (with some degree of confidence)

Disclaimer : I am not an expert of LaTeX and of all its features

(In the land of the blind, the one-eyed man is king...)

2. The structure of a Latex document :

A LaTeX file

`{mydoc.tex}`

is a file that contains commands that are interpreted (typesetted) to produce a document

It reads a little bit like a program, with a part that contains declarations and then a set of instructions

When

`{mydoc.tex}`

is typesetted, a few other files are produced :

`mydoc.aux`, `mydoc.dvi`, `mydoc.pdf`, `mydoc.log`,...

```

\documentclass[10pt]{article}

\usepackage{amsthm,amssymb}
\usepackage{epsfig,rotate}
\usepackage[]{amsmath}
\setlength\textwidth{37.2pc}

\newcommand{\be}{\begin{equation}}
\newtheorem{theorem}{Theorem}

\def\S{{\mathbf S}}
\def\alpha{{\alpha}}

%%-----

\begin{document}
The text and its formulas~:  $\alpha > \mathbf{S}$ 
\end{document}

```

Main features :

- There is a text environment and a math environment. The latter requires delimitation

```
\begin{equation}
S \varphi (x) = \int_{\Omega} G(x,y) \varphi(y) \, d \sigma(y)
\end{equation}
```

produces the text

$$S\varphi(x) = \int_{\Omega} G(x,y)\varphi(y) d\sigma(y) \quad (1)$$

The function $S \varphi$ is called the single layer potential

produces the text

The function $S\varphi$ is called the single layer potential

- There are specific instructions to produce accents, special characters, symbols

For instance, the instructions

```
$\a$ h\'et\'erog\'ene $\int$ $\cap$ $\cup$  
%% this line will not show up
```

produce

α hétérogène $\int \cap \cup$

- One can organize the spacing between characters or formulas

```
\hspace*{-10mm}Fill in \hspace{4cm} blanks $x \,,\geq \;;\;;\;; 10$
```

will give

Fill in

blanks $x \geq 10$

- You can write equations on several lines, give them a number that can be recalled in the text

```
\begin{eqnarray} \label{equation_1}
S \varphi(x) &=& g(x) - \partial_n u|_{\partial\Omega} \\
&& \\
&=& g(x) - \nabla u(x) \cdot \nu(x) \\
\nonumber
\end{eqnarray}
The relation~(\ref{equation_1}) is an integral equation.
```

produces the output

$$\begin{aligned} S\varphi(x) &= g(x) - \partial_n u|_{\partial\Omega} \\ &= g(x) - \nabla u(x) \cdot \nu(x) \end{aligned} \tag{2}$$

The relation (??) is an integral equation.

- One can produce matrices and lists

```
\begin{eqnarray*}
\left( \begin{array}{ccc}
1 & 2 & 3 \\
4 & 5 & 6 \end{array} \right)
&=& \left\{ \begin{array}{rcl}
x &=& \frac{1}{3} \\
2y &\sim& \text{à droite} \end{array} \right.
\end{eqnarray*}
```

results in

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix} = \left\{ \begin{array}{l} x = \frac{1}{3} \\ 2y \sim \text{à droite} \end{array} \right.$$

- One can include figures (or movies) of various formats

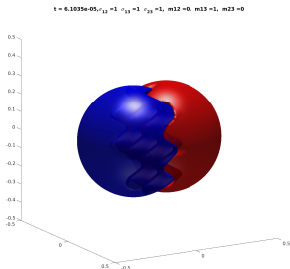
`\usepackage[]{graphicx}` (in the preamble)

`\begin{figure}[hbt]`

`\includegraphics[angle=0,height=40mm]{../Elie/Compar3D/test3D_bubbles.pdf}`

`\end{figure}`

will produce



- Beamer is a LaTeX class that is used to write slides or posters

```
\documentclass[mathserif,9pt]{beamer}
```

- The best way to start is to try to modify a .tex file that someone gave you
- There is a large community of developers and it is easy to find answers to precise questions on the net

Here is a link to a FAQ page

<https://2001-faq-latex.fr>

Your challenge this afternoon :

- Write a few slides (2-4 pages) of presentation

Your name, where do you come from, what are your projects, why did you choose to come to Grenoble, how is the academic system in your country, who are the main figures of your home university...

- Your presentation should contain pictures, mathematical symbols, colours
- I have posted a beamer template on the link I sent you yesterday, which you are welcome to use
- We will try to organize a zoom meeting next Thursday afternoon (if you agree) where you will be able to show these slides to your classmates