LaTeX 2$_\varepsilon$: An introduction++

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1. LaTeX ?

What is LaTeX?

- **Pronunciation** of LaTeX– the last letter is not an "x", but the Greek letter χ, which is pronounced as "k"; therefore we say "latek".
- **Text formatter** using a typographic programming language, rather than a word processor (Word)
- Editing scientific documents (a TeX document is a file written with any text editor in which the text is mixed with layout commands, similar to html code)
- LaTeX is a set of macro-commands (developed by Leslie Lamport) based on TeX (written by Donald Knuth in the 80's)
- LaTeX 2_ε allowed the addition of packages to meet specific needs (longtable, geometry, fancyhdr ...)
- LaTeX3 Project

Why LaTeX (instead of Word)?

- **for mathematical formulas easy to write and well disposed visually**
- for its free and available nature
- for its ease of switching from one platform to another (Windows, Unix, Linux, Apple) (useful in research centers where not all people necessarily work on the same platforms)
- for its ease of transport (very small files)
- for its multilingualism
- for a professional presentation, without worrying about the layout
- **for facilitated cross-references (figures, tables, bibliographic references, appendices, equations, theorems, sections, etc., and even a page number)**
- for the possibility of subdividing a document into several small files without worrying about pagination, cross-references, references
- **publishing houses and scientific journals have style files with template files**

The power of LaTeX

- How I use it
- Examples
  - scientific graphs
  - TEXample.net
  - Community — StackExchange
- How will you use it?
  - Overleaf Template: `https://fr.overleaf.com/`
  - GERAD Template: `https://www.gerad.ca/fr/publications/papers/cahiers-procedure`
  - Symbols: `http://detexify.kirelabs.org/classify.html`

The workshop

Objectives

- At the end of this workshop, you should understand what is LaTeX and be able to start your first document, know the possibilities offered by LaTeX, discern best practices, and know where and how to look for the answers to your questions.

Procedure

- We will see what constitutes a LaTeX document: the commands, the structure of a document, the creation of a title page, the mathematical mode, the text mode, the creation of lists, tables and the insertion of images. We will discuss what floating objects are, the creation of cross-references.
- We will finish with the technical aspects related to LaTeX, that is, its functioning, the different text editors and the compilation process.
- Finally, the references cited in the "Reference" section will be used throughout the workshop to demonstrate their usefulness.

The essentials

- The order of packages
- The number of packages
- A nice and clean code
- Leaving LaTeX doing its job

2. Source file

Special characters

LaTeX uses special characters for its commands:

\	control character of LaTeX
{ }	groupings or ordering parameters
&	alignments in tables and maths
#	used in macrocommands

Special characters

LaTeX uses special characters for its commands:

- `\` control character of LaTeX
- `{ }` groupings or ordering parameters
- `&` alignments in tables and maths
- `#` used in macrocommands
- `$` open and closes math mode
- `^` an exponent in math mode, `$x^p$` will give x^p
- `_` index in math mode, `$x_p$` will give x_p
- `~` unbreakable space
  As ~ is a character that is also used as an accent on letters, In Spanish, for example, to make it appear on its own, you must use `textasciitilde`. In the case of a web page address, use `{$\sim$}`, which will give ∼. For half unbreakable space, do `\,`.
- `%` to write comments. Everything that follows the character % on the same line is ignored by LaTeX. For a paragraph on several lines, you must put % at the beginning of each line.

To have these characters in a text, you must precede them by `\`. Example: `\$` will give $.
Only the backslash must be written `$\backslash$` in math mode or `\textbackslash` in normal mode. `\\` is a command to change a line with LaTeX.

The three essential commands

1. `\documentclass[options]{style}` *first active command*

- **Styles :** article, report, book, beamer ...
- **Options :** font size (12pt, 11pt, 10pt – by default font), fleqn, leqno, twoside, twocolumn ...
- **Preamble :** defining macros, redefinition of commands, packages, commands that affects all the document ...

✓ *Everything that goes after the* `\end{document}` *is ignored by LaTeX; you can leave comments, notes or text to be used later.*

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2. `\begin{document}`

   text of the document

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Example of a source file

```
\documentclass[11pt]{article}
\usepackage{amsmath,amsfonts,amssymb}
\usepackage{latexsym}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{letterpaper, tmargin=3cm,
bmargin=3cm, lmargin=3cm, rmargin=3cm}
\pagestyle{plain}
  \title{Titre du document}
  \author{Moi-m\^eme}
  \date{Mai 2013}
\begin{document}
\maketitle
  \thispagestyle{empty}
  \newpage
  \thispagestyle{empty}
\tableofcontents
  \newpage
  \thispagestyle{empty}
\begin{abstract}
Ceci est un r\'esum\'e de ce fameux papier
que j'\'ecrirai plus tard.
\end{abstract}
  \newpage
  \setcounter{page}{1}
\section{Introduction}
\label{sec-intro}
Et voil\`a c'est parti!!!
Bla-bla-bla ...
\section*{Remerciements}
Je d\'esire remercier mon p\`ere, ma m\`ere ...
\begin{thebibliography}{99}
  \bibitem{GooMS1994}
Goossens, M., Mittelbach, F., Samarin, A.,
\textit{The LaTeX Companion},
Addison-Wesley Publishing Company, 1994.
\end{thebibliography}
\end{document}
```

préambule

page titre

table des matières

résumé

document

bibliographie

Commands

- 2 modes: text mode or normal and math mode
  - differents accents, different spacing, etc.
- Types of commands:
  - commands using letters (`$\sum a_i$` $= \sum a_i$)
    - ✓ they require an extra space, otherwise you change the name of the command, for example: `$\suma_i$`, will give when compiled …`\suma - command undefined`.
  - commands using characters other than letters (accents `\'et\'e` = été)
  - commands modifying the contents of the current grouping starting from the insertion point (`\bfseries`, `\itshape`)
  - commands modifying solely the contents of the following grouping (`\textbf{}`, `\textit{}`)
  - environments commands – grouping starting on another line (`\begin{center}` …`\end{center}`, `\begin{quote}` …`\end{quote}`)
  - Commands can have one or more parameters, enclosed in braces: `{ }`. They can also have optional parameters, in square brackets: `[ ]`.
    - `\newline` (no parameters)
    - `\frac{n+1}{n+2}` (two parameters)
    - `\documentclass[12pt]{article}` (two parameters, one optional and one necessary)

Accents and symbols											
ò	\`o	ó	\'o	ô	\^o	õ	\~o	ō	\=o	ȯ	\.o
ö	\"o	ŏ	\u{o}	ǒ	\v{o}	ő	\H{o}	o	\c{o}	ọ	\d{o}
o̱	\b{o}	o͡o	\t{oo}								
œ	\oe	Œ	\OE	æ	\ae	Æ	\AE	å	\aa	Å	\AA
ø	\o	Ø	\O	ł	\l	Ł	\L				
ı	\i	ȷ	\j	¡	!`	¿	?`				

Fonts			
\textrm{...}	roman	\texttt{...}	typewriter
\textsf{...}	sans serif	\textbf{...}	**bold face**
\textup{...}	upright	\textit{...}	*italic*
\textsc{...}	SMALL CAPS	\textsl{...}	*slanted*
\textnormal{...}	document font	\emph{...}	*emphasised*

Sizes	
\tiny	\large
\scriptsize	\Large
\footnotesize	\LARGE
\small	\huge
\normalsize	\Huge

Structure of a document

- \part{Title of a part}
- \chapter{Title of a chapter} (document class "report" and "book")
- \section{Title of a section}
- \subsection{Title of a sub-section}
- \subsubsection{Title of a sub-sub-section}
- \paragraph{Title of a paragraph} (text on the same line than the title)
- \subparagraph{Title of the sub-paragraph} (text on the same line than the title)
- \maketitle (title page, see next page)
- \tableofcontents (table of content), also \listoffigures and \listoftables
- \begin{abstract} ...\end{abstract} (abstract, font smaller and indented on both sizes)
- \footnote{text} (footnote)

✓ *The star (`\section*{Titre de section}`) removes the numbers (no more reference possible), but keeps the same style.*

Title page

- `\title{Title of the document}`
- `\author{Author}` – `\and` between each author
- `\date{}` - leave blank if you don't want a date, otherwise it will be set automatically
- `\maketitle` – where we want the title to appear

Text

- multiple spaces between words and/or between lines are considered as a single space
- \\ or `\newline`: line break without starting a new paragraph

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- `\newpage`: a forced page break

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- multiple spaces between words and/or between lines are considered as a single space
- `\\` or `\newline`: line break without starting a new paragraph
- a minimum of two line breaks: paragraph change
- `\break`: change of line, justifying the line on which it is written
- `\newpage`: a forced page break
- `\pagebreak`: a desired page break
- `\clearpage`: empty the float memory and create a new page
- word hyphenation:
  - locally: `su\-per\-la\-tif`
  - globally: `\hyphenation{su-per-la-tif}` in the preamble

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- word hyphenation:
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✓ *Be careful with quotation marks: don't use the* " *key on the keyboard. In typography, there must be opening and closing quotation marks. In English, use two* ‘ *for opening and two* ’ *for closing.*

Math mode

- in the text: in between `\(...\)` **or $ ...$**

  `100 m$^{3}$ of water \ldots\ then $\alpha = \sqrt{5}$` will give 100 m^3 of water ... then $\alpha = \sqrt{5}$

  ✓ *do not use maths to italicize text – spacing and accents are different*

- in display (centered, space on top and under): in between `\[...\]`

  `\[ c^{2}=a^{2}+b^{2} \]` will give

$$c^2 = a^2 + b^2$$

  ✓ $$ ... $$ *works, but we ask you not to use them any more, as they are no longer taken into account by certain class options.*

- numbered displayed (centered, space at top and bottom, automatic numbering and possible reference):

```
\begin{equation}
\epsilon > 0  \label{eq:eps}
\end{equation}
```

$$\epsilon > 0 \tag{1}$$

✓ *There are several other mathematical environments (align, multline, eqnarray ...) to see in the next class.*

Spacing

- possible measurement units:

mm	millimeter
cm	centimeter
in	inche
pt	point $\approx 1/72$ inche $\approx .35$ mm
em	width of a `m` in the current font
ex	height of a `x` in the current font

- horizontal spacing: `\hspace{mesure}` or `\hspace*{mesure}`
  also `\quad`, `\qquad` and in maths: `$\, \> \!$`
- vertical spacing: `\vspace{mesure}` or `\vspace*{mesure}`
  also `\smallskip`, `\medskip` ou `\bigskip` which are spacings according to the size of the font used

✓ *The star shape obliges LaTeX to respect what is requested, even in cases where it doesn't take this into account because of its layout.*

3. Lists

Three environments:

- `itemize` for simple lists
- `enumerate` for numbered lists
- `description` for descriptions

Itemize environment

Sans option – compteur de LaTeX

```
\begin{itemize}
\item Premier niveau.

\begin{itemize}
\item Deuxième niveau.
\end{itemize}

\item Nous sommes revenus au premier niveau
avec le compteur de \LaTeX.
\end{itemize}
```

- Premier niveau.
  - Deuxième niveau.
- Nous sommes revenus au premier niveau avec le compteur de LaTeX.

Avec options

```
\begin{itemize}
\item[i)] Nous avons décidé d'employer
des lettres suivies de parenthèses.
\item[ii)] On peut ici aussi employer un
deuxième niveau.

\begin{itemize}
\item[\textit{(a)}] On peut également
changer la fonte.
\end{itemize}

\item[iii)] Retour au premier niveau.
\end{itemize}
Ceci est la largeur totale du texte
sans aucune indentation.
```

i) Nous avons décidé d'employer des lettres suivies de parenthèses.

ii) On peut ici aussi employer un deuxième niveau.

(a) On peut également changer la fonte.

iii) Retour au premier niveau.

Ceci est la largeur totale du texte sans aucune indentation.

Enumerate environment

Sans option – compteur de LaTeX

```
\begin{enumerate}
\item Premier niveau.

\begin{enumerate}
\item Deuxième niveau.
\end{enumerate}

\item Nous sommes revenus au premier niveau
avec le compteur de \LaTeX.
\end{enumerate}
```

1. Premier niveau.
   (a) Deuxième niveau.
2. Nous sommes revenus au premier niveau avec le compteur de LaTeX.

Description environment

Sans option – compteur de LaTeX

```
\begin{description}
\item  Premier niveau.  À noter que la deuxième
ligne et les suivantes sont indentées.

\begin{description}
\item  Deuxième niveau.  Ici aussi les autres
lignes seront indentées.
\end{description}

\item  Nous sommes revenus au premier niveau
avec le compteur de \LaTeX.
\end{description}
```

Premier niveau. À noter que la deuxième ligne et les suivantes sont indentées.

Deuxième niveau. Ici aussi les autres lignes seront indentées par rapport à la première.

Nous sommes revenus au premier niveau avec le compteur de LaTeX.

Avec options

```
\begin{description}
\item[essai 1] Notez que l'option est en gras et
que la deuxième ligne sera indentée.
\item[essai 2] On peut ici aussi employer un
deuxième niveau.

\begin{description}
\item[\textit{(a)}] On peut également changer la
fonte et c'est toujours en gras.
\end{description}

\end{description}
Ceci est la largeur totale du texte sans aucune
indentation.
```

essai 1 Notez que l'option est en gras et que la deuxième ligne sera indentée.

essai 2 On peut ici aussi employer un deuxième niveau.

(a) On peut également changer la fonte et c'est toujours en gras.

Ceci est la largeur totale du texte sans aucune indentation.

4. Tables

```
\begin{tabular}{table description}
texte du tableau
\end{tabular}
```

- table description:
  - `l` column with left aligned text
  - `r` column with right aligned text
  - `c` column with centered aligned text
  - `p{width}` column with justified text on many lines
  - `|` table's vertical line
- in the table:
  - `&` pass to the next column
  - `\\` to the next row
  - `\hline` insert an horizontal line
- tables where the description is a sequence (little trick):
  - `\begin{tabular}{*{n}{columns style}}` where n is the number of repetitions, and the model can be any column specifier
    - `{l*{3}{cccr}}`
    - `{l*{12}{r}}` instead of `{lrrrrrrrrrrrr}`

Examples of tables

100	camels
3700	goats
1111	elephants
4911	animals

```
\begin{tabular}{rl}
\toprule
100 & camels \\
3700 & goats \\
1111 & elephants \\
\midrule
4911 & animals \\
\bottomrule
\end{tabular}
```

100	camels and elephants
3700	goats, giraffe and koalas

```
\begin{tabular}{lp{2.5cm}}
\toprule
100 & camels and elephants \\
3700 & goats, giraffe and \newline
koalas \\
\bottomrule
\end{tabular}
```

Tip for aligning columns differently with the array extension.
Commands to put in the preamble:

```
\newcolumntype{L}[1]{>{\raggedright\arraybackslash}p{#1}}
\newcolumntype{C}[1]{>{\centering\arraybackslash}p{#1}}
\newcolumntype{R}[1]{>{\raggedleft\arraybackslash}p{#1}}
```

5. Inserting images

- `\usepackage{graphicx}`
- files in eps or pdf/jpg/png format for PDF LaTeX
- `\includegraphics{figure-intro.pdf}`
- optionnals parameters

width	width of the figure
height	height of the figure
angle	turn figure clockwise (degrees)
scale	scale of the figure

```
\includegraphics[width=1cm]{figure-intro.jpg}
```

✓ *To avoid distorting the image, define only the width or height, and LaTeX will resize it proportion to the original.*

6. Crossed references

Why should you use labels?[1]

Labels facilitate changes

- Easy for references
- A label will not change, but its number can change
- LaTeX automatically changes the number

[1] This section is drawn from Cherkesly et al. (2023), pp.10–12

Important elements to remember

Create a label

- Use `\label{...}` next to your object
- Give a name that makes sense, e.g., `\label{sec:Introduction}`
  - sec for Sections
  - eq for Equations
  - fig for Figures
  - tab for Tables
  - alg for Algorithms
- Avoid empty spaces in the names, e.g., `\label{sec Intro}`, and non-typical characters, e.g., `\label{sec:Modèle}`,
- NEVER use the "final" numbering in the labels, e.g., `\label{sec:3}`

Important elements to remember

Refer to the label

- `\label{marker}` : Used to give the object (figure, section, table, equation, ...) you want to reference a marker – a name which can be used to refer to that object later
- `~\ref{marker}` : Used to reference an object with the specified marker. This will print the number that was assigned to the object
- `~\eqref{marker}` : refers to the label given to the equation and automatically places brackets around the equation number
- `\bibitem{marker}` : refers to the label given to a bibliography entry
- `~\cite{marker}` : reref in the text texte to the bibliography entry

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Refer to the label

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✓ *Note that it is the* `caption` *that gives the numbers to the floating objects. The* `label` *must be placed after or inside the* `caption`.

7. Floating objects

Figures, tables, algorithms, ...

- floating objects or environments, i.e. location chosen by LaTeX as close as possible to where they are required
- optional parameters or **placement**

  t for "top" of the page
  b for "bottom" of the page
  p for "page", a floating page
  h for "here", just here
  ! ignore internal parameters (e.g. maximum number of floats per page)

- `\caption{title}` – in top or bottom of the environment, at your choice
- numbered – possible reference
- `\listoffigures` or `\listoftables`

✓ *Do not put the* `caption` *and/or the* `label` *in the environment* `center`*. This mixes up the counter and runs the risk of setting the section number when you try to refer to the floating object. What's more, the centralized position of the* `caption` *is determined by the document class.*

Examples of floating objects

```
\begin{figure}[!tb]
\centering
\includegraphics[width=3cm]{licorne.png}
\caption{My first figure}
\label{fig:intro}
\end{figure}
```

Figure 1: My first figure

```
\begin{table}[!tb]
\caption{My first table}
\label{tab:intro}
\begin{center}
\begin{tabular}{lcr}
\toprule
\multicolumn{3}{c}{\textbf{Tabular in a table}}\\
\midrule
First column & Second column
& Third column\\
and & so & on \dots\\
\bottomrule
\end{tabular}
\end{center}
\end{table}
```

Table 2: My first table

Tabular in a table		
First column	Second column	Third column
and	so	on

Figure ... many images

- **many images with only one title:** many commands `\includegraphics{...}` in the same environment `figure`
- **many images with many incremented titles:** many commands `\caption{...}` in the same environment `figure`; the figures will however be one after the other (this can be useful for two figures that absolutely must follow each other on the same page).
- **multiple images with multiple titles incremented, but side by side:** many commands `\caption{...}` in the same environment `figure`, in the colums of a `tabular`
  or
  many commands `\caption{...}` in the same environment `figure`, in `minipages`
- **many images with subtitles and global title for the figure:** using the environment `subfigure` of the package `subcaption`
  (possibility of referring to the sub-figure or global figure)
- **packages subfig and subfigure:** Obsolete packages
- **packages subfig and subcaption:** incompatibility
- `\usepackage{float}` Exercise caution
- `\usepackage[section]{placeins}` Keeps the tables and the figures in their section.

Figure 2: A figure

```
\begin{figure}[!h]
\centering
\includegraphics[width=.2\linewidth]{cat.png}
\caption{A figure}
\label{fig:2}
\end{figure}
```

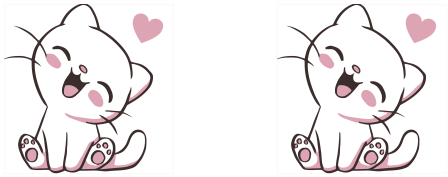


Figure 3: Two images, only one title

```
\begin{figure}[!h]
\centering
\includegraphics[width=.2\linewidth]{cat.png}
\qquad
\includegraphics[width=.2\linewidth]{cat.png}
\caption{Two images, only one title}\label{fig:3}
```

Figure 4: Two images, two titles

Figure 5: Two images, two titles

```
\begin{figure}[!h]
\centering
\includegraphics[width=.1\linewidth]{cat.png}
\caption{Two images, two titles\label{fig:4}}
\qquad \includegraphics[width=.1\linewidth]{cat.png}
\caption{Two images, two titles\label{fig:5}}
\end{figure}
```

✓ *For Figures 4 and 5, there is only one environment* `figure`*, but two commands* `caption`*. This can be useful for two figures that need to follow each other and that you don't want to separate.*

Figure 6: Two images, two titles, but side by side, tabular environment

Figure 7: Two images, two titles, ...

```
\begin{figure}[!h]
\centering
\begin{tabular}{p{.47\textwidth}p{.4\textwidth}}
\centering\includegraphics[width=.1\linewidth]{cat.png}\newline
\caption{Two images, two titles, but side by side,
tabular environment \label{fig:6}}
&
\centering\includegraphics[width=.2\linewidth]{cat.png}\newline
\caption{Two images, two titles, ...  \label{fig:7}}
\end{tabular}
\end{figure}
```

✓ *Be careful, as adding other serials to the table may create an error message. In this case, remove the command & from the 2nd horizontal serie and add a* `\tabularnewline` *at the end of the first section. (see examples)*

Figure 8: Two images, two titles, but side by side, minipage environment

Figure 9: Two images, two titles, but side by side, minipage environment

```
\begin{figure}[!h]
\centering
\begin{minipage}[b]{0.4\textwidth}
\centering
\includegraphics[width=.7\linewidth]{cat.png}
\caption{Two images, two titles, but side by side,
minipage environment}\label{fig:8}
\end{minipage}
%
\qquad
%
\begin{minipage}[b]{0.45\textwidth}
\centering
\includegraphics[width=.5\linewidth]{cat.png}
\caption{Two images, two titles, but side by side,
minipage environment} \label{fig:9}
\end{minipage}
\end{figure}
```

(a) Sub-figure 1

(b) Sub-figure 2

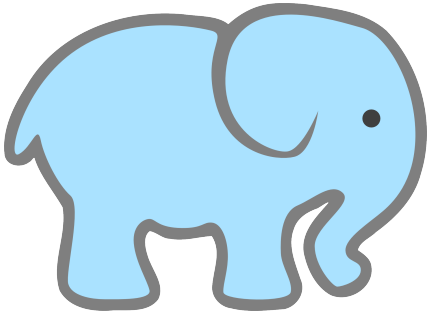
Figure 10: One figure with two images, two sub-titles, subfigure environment

```
\begin{figure}[!h]
\centering
\begin{subfigure}[b]{.3\textwidth}
\centering
\includegraphics[width=.1\linewidth]{cat.png}
\caption{Sub-figure 1} \label{fig:sub1}
\end{subfigure}
\begin{subfigure}[b]{.3\textwidth}
\centering
\includegraphics[width=.2\linewidth]{cat.png}
\caption{Sub-figure 2} \label{fig:sub2}
\end{subfigure}
\caption{One figure with two images, two sub-titles, subfigure
environment} \label{fig:10}
\end{figure}
```

✓ *Note here that we can refer to the sub-figure* (10a)*, or the the whole figure* (10)*.*

✓ *We must use the* `subcaption` *package in the preamble.*

(a) A cat



(b) An elephant

Figure 11: the subcaptionbox command

```
\begin{figure}[h!]
\centering
\subcaptionbox{A cat\label{fig:cat}}
[.4\linewidth]{\includegraphics[width=0.25\textwidth]{cat}}
\subcaptionbox{An elephant\label{fig:elephant}}
[.4\linewidth]{\includegraphics[width=0.25\textwidth]{elephant}}
\caption{the subcaptionbox command}\label{fig:animals}
\end{figure}
```

✓ *Note here that we can also refer to the sub-figure* (11a), *or the the whole figure* (11).
✓ *We must use the* `subcaption` *in the preamble.*

8. Packages

- `\usepackage{graphicx}` to embed graphics files, eps with LaTeX, pdf or jpg with PDFLaTeX
- `\usepackage{amsmath,amssymb,amsfonts}` standard for matheematics allowing access to special characters
- `\usepackage{latexsym}` for some mathematical symbols
- `\usepackage{longtable}` for tables longer than one page
- `\usepackage{geometry}` to adjust margins
- `\usepackage{fancyhdr}` for managing headers and footers
- `\usepackage[francais,english]{babel}` pour utiliser plusieurs langues dans le même document – les commandes restent en anglais, mais LaTeX gère la typographie dans la langue demandée (exemple : "Abstract" devient "Résumé" en français). Dans le document, on change de langue avec la commande `\selectlanguage{francais}`
- `\usepackage[options]{natbib}` for bibliographies where you want the author's name and year of publication to appear in the text instead of the reference number. Even with a digital bibliography, `natbib` allows greater versatility, for example, choose the following options `[sort,numbers]`
- `\usepackage[nameinlink]{cleveref}` makes the best use of hyper-referencing tools

✓ `\usepackage[options]{package}` in the preamble.

- `\usepackage[textwidth=.9\marginparwidth,linecolor=gray, textsize=scriptsize,colorinlistoftodos]{todonotes}` produces note boxes with colored text in the margin. Add: `\todo{Is it OK?}`
- `\usepackage[section]{placeins}` keep tables and figures in their section

✓ There are many others, for practically every problematic situation in the edition.
✓ **Note :** these are macro commands that can conflict with each other.
✓ Don't forget that with each extension, you'll need to learn new commands.

9. Commands

Why should you use commands?[2]

Main reasons to use commands

- Easily change the name of a concept or the choice of notation
- Track changes in the text and make comments (e.g., with colors)

[2] This section is drawn from Cherkesly et al. (2023), pp.15–19

Commands for concepts

Facilitate changes in how you name a concept
An example: The multi-compartment vehicle routing problem could be MCVRP or VRPMC

In the preamble

- Create a command
  - `\newcommand{\VRPMC}{VRPMC\xspace}`
  - `\newcommand{\iToi}{item compatibility\xspace}`

In the main document

- Use your commands
  - `The \VRPMC is` → The VRPMC is
  - `We define \iToi as` → We define item compatibility as

Commands for notation

Facilitate changes to the choice of notation
Help keep track of all your used notation
An example: Using $[a_i, b_i]$ or $[\underline{w}_i, \overline{w}_i]$ for time windows

In the preamble

- Create a command
  - `\newcommand{\TWStart}{\underline{w}}`
  - `\newcommand{\TWEnd}{\overline{w}}`

In the main document

- Use your commands
  - `Each node $i$ is associated with a time window $[\TWStart_i, \TWEnd_i]$`
  - Each node i is associated with a time window $[\underline{w}_i, \overline{w}_i]$

Commands with colors

Track changes in the text and make comments

In the preamble

- Create a command, e.g.,
  `\newcommand{\marilene}[1]{{\color{magenta} #1}}`
- You can create multiple commands for multiple authors or multiple purposes using different colors

In the main document

- Use your command to change the color
  `\marilene{Marilene has changed this sentence.}`
- Marilene has changed this sentence.

Conclusion

Outlook
Questions

References

- Cherkesly, M., Gruson, M., Quesnel, F., *LaTeX for scientific writing*, Workshop from the Communicating OR/MS: The Scientific Writing Activity, GERAD, decembre 2023. https://www.gerad.ca/fr/events/2167/view.

Websites

- Wikibooks : http://en.wikibooks.org/wiki/LaTeX
- Site CTAN : http://www.ctan.org
- **FAQ** LaTeX anglais : http://www.tex.ac.uk
- Projet LaTeX : http://www.latex-project.org
- Symboles : http://detexify.kirelabs.org/classify.html
- BibTeX, JabRef : https://guides.biblio.polymtl.ca/bibtex
- **Questions/Answers:** https://tex.stackexchange.com

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