

# L<sup>A</sup>T<sub>E</sub>X for scientific writing

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# Disclaimer

The objective consists of highlighting the main challenges and how to address them when using and collaborating with  $\text{\LaTeX}$

## Using $\text{\LaTeX}$

- We are not  $\text{\LaTeX}$  experts, but  $\text{\LaTeX}$  users
- You might have other good (or better!) ideas, and use them!
- In any case... when you don't know Google it! (we will get back to this later)

# Structure of a $\text{\LaTeX}$ file

## Preamble

```
\documentclass[10pt]{article}  
\usepackage{packages}
```

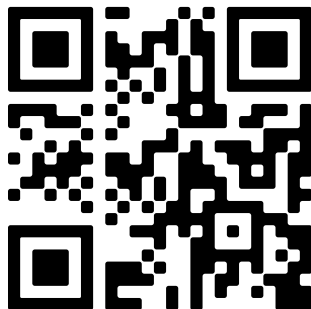
## Main document

```
\begin{document}  
\end{document}
```

# 1. Collaborating with Overleaf

# Sample project

## For exercises



<https://fr.overleaf.com/read/vxchsmwztshv#273e48>

# Why use Overleaf? (we swear they don't pay us!)

## Easily share your project

- Several collaborators can edit at the same time.  
1 collab. in the free version, 10 in premium.
- Share with/without edit permissions.
- Work from several computers.

## No need to manage packages

- Most packages you need are already installed.
- You can always add your custom packages.

# Other features

## Nice editor

- Switch between WYSIWYG and code.
- Autocomplete citations and references.
- PDF in split screen or other tab.

## Collaboration

- Review feature.
- Track changes (History feature).  
24h in free version, all history in premium version

## Support

- Large community of users.
- Several sample projects that can be edited.

# Premium features

## Sync options

- Dropbox
- Git/GitHub
- Reference managers (Mendeley/Zotero)

## Other premium features

- More compile time (for big projects).
- Symbol palette in the UI.



## 2. Labels

# Why should you use labels?

## Labels facilitate changes

- Easy for references
- A label will not change, but its number can change
- $\text{\LaTeX}$  automatically changes the number

# 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

- Use `\ref{ref:abc}` in general
- Use `\eqref{eq:subtours}` for equations in parentheses (amsmath package required)

# Small exercise

- In the mathematical model, label each element (objective function and constraints) and refer to these using `\eqref{}`
- Label the sections and use `\ref{}` to refer to them in the last paragraph of the Introduction
- Label Table 1 and use `\ref{}` to refer to it in the following paragraph

### 3. Commands

# Why should you use commands?

## 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)

# 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\hspace}`
  - `\newcommand{\iToi}{item compatibility\hspace}`

## 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{\TWEEnd}{\overline{w}}`

## In the main document

- Use your commands
  - Each node  $i$  is associated with a time window  $[\backslashTWStart_i, \backslashTWEEnd_i]$
  - 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.**

# Small exercise

- Create a command for a concept, referring to the vehicle routing problem as the VRP or the CVRP
- Create a command for another concept, referring to Enhanced Genetic-Tabu Search Algorithm as EG TSA
- Create a command for the variables  $y_r$
- Create a command to add a comment in **magenta**

## 4. Bibliography using Natbib

# We don't talk about BibTeX!

## L<sup>A</sup>T<sub>E</sub>X bibliographies are confusing!

- Weird configuration styles
- Two competing packages : natbib vs biblatex so googling can be hard!
- You need to “compile” your bibliography

## This tutorial is about natbib because...

- Better-suited for STEM-style citations
- More widely accepted
- We had to choose one
- It's the one we usually use (unless something else is required in journal templates)!

## Important note

Natbib doesn't work with beamer... I had to fake my examples here!

# The .bib file

## Contains :

- All bibliographical informations
- The required fields depend on the publication type
- Citation keys (must be unique)

## How to build

- Export *bibtex* citation from :
  - Google Scholar
  - The publication website
- Reference managers (Mendeley, Zotero) can build it for you

## Notes

- Natbib will work even if some fields are missing
- Always double and triple check references: watch out for mistakes!

# Simple usage

## In the preamble

- Load the natbib package
- Select bibliography style
- Customize citations (more details later)

## Citing in the text

- Use the `\cite{...}` command (or one of its variants, more details later)

## Printing the bibliography

- Use the `\bibliography{bib_file}` command
- References the bib file
- Citations won't work if omitted!

# Compiling your bibliography

## Overleaf

- Nothing special to do!  
Overleaf has a magical script that works everything out
- Might need to “compile from scratch” sometimes

## Other

- 1 `pdflatex document.tex` (figure out which .bib file to use)
- 2 `bibtex document` (compile the bib file)
- 3 `pdflatex document.tex` (figure out what references need to be used)
- 4 `pdflatex document.tex` (create the bibliography)

Fortunately, you only need to do that when the bib file changes



# Citations formats

## Citation options

- **Regular** : `\cite{...}`
- **Parenthesis** : `\citep{...}`  
**Note** : (`\cite{...}`) creates double parenthesis!
- **Parenthesis with prefix/suffix** :  
`\citep[prefix][suffix]{...}`
  - Use case : "(see Quesnel et al. 2023 for more information)"
  - Prefix and/or suffix can be empty (but brackets are necessary)
- **Several citations at once** `\cite{label1, label2, ...}`  
also works with `\citep{...}`

# Configuring citations

## Package options

- **Author-year, e.g., Quesnel (2023) :**  
`\usepackage[authoryear]{natbib}`
- **Citations numérotées, e.g., [24] :**  
`\usepackage[numbers]{natbib}`

## The .bst file

- Takes care of citation and bibliography formatting
- Overleaf has several predefined styles
- See [https://www.overleaf.com/learn/latex/Natbib\\_bibliography\\_styles](https://www.overleaf.com/learn/latex/Natbib_bibliography_styles)
- You can also include a custom .bst file and reference it
- Some publications use a custom .bst file (you can download it)
- Do NOT attempt to modify a .bst file by hand
- Use command `latex makebst` to create a custom .bst file.

It will ask a lot of questions!

## Small exercise

- Add the references "VIDAL2020401", "Konstantakopoulos2022" and "ASGHARI2021107899" (from the bib file) at the end of the sentence *The VRP has been widely studied due to its practical relevance in various industries, such as distribution, e-commerce, and public transportation*. The reference must be in parenthesis, and it must start with "see, e.g.,".
- Put the references in the literature review in parenthesis
- Change the bibliography so as it is shown in alphabetical order (google it!)

## 5. Google it!

# Uh oh! I don't know what to do!

Google it!

## Small exercise (slide 1 of 2)

I want to remove all indentations before the paragraphs (see example file).

How can I do it?

## Small exercise (slide 2 of 2)

Use Google

“latex remove space before paragraph”

<https://shorturl.at/qDLUV>

## Small exercise for you

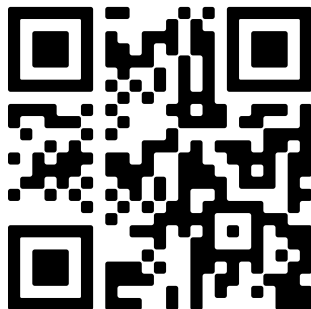
- Add one affiliation per author (the affiliation must be different between the two authors), and an email address per author
- Add a footnote to refer to the Wikipedia webpage of the VRP when it appears for the first time in the introduction
- Resize Table 1 so as it fits in one page



## 6. Now it's your turn!

# Sample project

## For exercises



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