

Week 10

We have seen the basic commands for producing a LaTeX document, with some mathematics and cross-references. Now we want to add more complexity.

Script

Packages

As your document grows in size you will want to improve its appearance and to use shortcuts for doing more complicated tasks.

External packages may alter the appearance of the document, or provide useful commands. This is similar to packages or modules in Python. To include an external package then, in the preamble, use the command `\usepackage{...}`. For example, the command `\usepackage{amsmath}` imports the standard typesetting of the American Mathematical Society, which is particularly useful for mathematicians. A brief list of useful packages includes

- `graphicx` : include graphics files for figures in your document.
- `amsmath` , `amssymb` , `amsthm` : mathematical typesetting.
- `hyperref` : add internal and external hyperlinks to the PDF document.
- `fancyhdr` , `enumerate` , `caption` , `geometry` : control the document layout and appearance more transparently.
- `physics` : helps with, e.g., differential equations.

Exercise

1. Using the `amsmath` package, investigate the `align` environment. Typeset

$$\begin{aligned}x + y &= z, \\ c_1 + 2c_2 &= z.\end{aligned}$$

2. Investigate the `pmatrix` environment. Typeset

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}.$$

3. Label and cross-reference your equations.

Figures

Figures and tables are *floating* objects in LaTeX. That is, LaTeX will position them where it feels they look best. However, they have captions and can be cross-referenced in a range of clever ways.

- Look at the `BasicLatexFigure.tex` document.
- Look at the `graphicx` package, and the `\includegraphics` command to include figures.

Exercise

1. Include a figure from your own computer in the document (for Overleaf, you need to upload the figure first).
2. Ensure all figures have captions and cross-references.

3. Experiment with changing the size of the figures. See what `width=\textwidth` does, for example.