Applied LaTeX for Researchers

Lecture 1: Introduction and Basics

Daniel Sánchez, M.A.

Laboratorio de Investigación para el Desarrollo del Ecuador

Spring 2025

What is LaTeX ? Why even care?

- A typesetting system, widely used in academia.
- Allows for additional control over the structure and layout of documents other software does not easily provide.
- Free, open-source, and cross-platform.
- *What you see is what you mean* (WYSIWYM) vs. *What you see is what you get* (WYSIWYG).
- Allows for the creation and automation of complex, structured and consistent documents.

Outline

Brief History

- Created by Leslie Lamport in 1983 while working at Stanford Research Institute.
- Based on Donald Knuth's TEX typesetting system (1978).
- LATEX is a set of macros for TEX.
- Current version is LATEX 2_ε, released in 1994, replacing LATEX2.09.

Important keys

- **Command keys:** \
- **Curly braces:** { }
- **Square brackets:** [ ]
- **Percent sign:** % (comments)
- **Dollar sign:** $ (math mode)
- **Underscore:** _
- **Circumflex:** ^
- **Tilde:** ~
- **Backslash:** \

Using LaTeX locally

- You will need a TeX distribution.
- For Windows, MikTeX is a popular choice, or TeX Live.
- A LaTeX editor will also be needed.
  - TeXWorks
  - TeXMaker
  - TeXStudio
  - Sublime Text
  - VS Code

Using LaTeXonline

- Overleaf is a popular online LaTeX editor.
- Share projects with collaborators.
- Real-time collaboration.
- Access to a wide range of templates.
- Free and paid versions.
- IMO great for starters and probably the best option for collaborative work and best-looking UI.

Basic structure

- A LaTeX document is divided into two main parts: the preamble and the body.
- The preamble contains document-wide settings and commands.
- The body contains the content of the document (text, figures, tables, etc.).
- The document is enclosed in the `document` environment.

Document preamble

- The preamble is the first part of the document, containing configuration settings for the complete document.
- Technically, it is a TEXenvironment (more on that later)
- We can set the document class, font size, margins, packages, etc.
- The preamble is enclosed between `documentclass` and `begin{document}` commands.

Writing commands/code

- Commands start with a backslash (\).
- Commands can have arguments enclosed in curly braces ({ }).
- Some commands have optional arguments enclosed in square brackets ([ ]).
- Comments are preceded by a percent sign (%).
- Commands are case-sensitive.

Declaring the document class

- The document class defines the overall layout of the document.
- The most common document classes are `article`, `report`, `book`, and `beamer`.
- Declared with the `documentclass` command.
- We will typically work with the `article` class.

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