

LaTeX TED Talk

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1 Introduction

LaTeX pronounced (“lay-tech” or “lah-tech”) is a brilliant typesetting language often used in mathematical papers. LaTeX is a set of macros based in Tex. This means that in LaTeX, one is given access to a large database of Tex-based commands. In turn, this makes LaTeX incredibly useful purely in terms of the massive number of in-built features. The typeset itself is beautiful. From series to integrals to matrices, LaTeX has every symbol you could ever need.

$$\int_{-1}^1 \frac{1}{x} \sqrt{\frac{1+x}{1-x}} \ln \left(\frac{2x^2 + 2x + 1}{2x^2 - 2x + 1} \right) dx = 4\pi \operatorname{arccot} \sqrt{\phi}, \quad \sum_{n=0}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}, \quad I_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$


2 Structure and Internal References

Some of LaTeX’s most useful features are with regard to structure. LaTeX comes with pre-built sections and subsections, and the command “\tableofcontents” creates a dynamic table of contents that changes with the number of pages and the first title of each subsection. Additionally, LaTeX is also built around internal references. For instance, table numbers and theorems can be dynamically numbered or ordered with regard to the given section/subsection.

2.1 This is a subsection!

Theorem 1. Theorem number one! This “labeling” was done automatically.

3 Packages, Customization, and Popularity

Packages in LaTeX are files with extra commands put together for the sake of improved styling. Many popular online packages are extremely useful. For example, the “amsthm” package allows you to write theorems as demonstrated above. Meanwhile, the “real hats” package gives your vectors fun randomized hats like this: $\hat{\mathbf{u}}$. Additionally, the “tikz” package allows you to draw with pixels, allowing you to create built-in waffles like this one! 

4 Pandoc, PyLaTeX, and How to Use LaTeX in HTML

PyLaTeX is a Python library used to create and render LaTeX files. PyLaTeX can be used to create PDFs from a LaTeX file. Pandoc is a universal markup converter that takes one markup format and turns it into another format. With these tools, we can write HTML files with LaTeX classes, resulting in dynamic PDFs that can be downloaded or integrated into websites.