

# Introduction to $\text{\LaTeX}$ {with Overleaf}

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- Why Overleaf?
- Creating Our First Document
- Basics (Paper and Templates)
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- Math & Graphics
- Presentation

# Introduction to $\text{\LaTeX}$

## Abstract

Some examples of how the packages `tikz`, `pgfplots` can be used to create fully vectorized graphics directly in the latex document. An example of how a flow chart can be generated in latex is also given. It combines the packages `tikz` and `overpic` and shows how to overlay/embed intrinsic latex text onto images created elsewhere.

Figure 1, is the first example illustrating how to graph analytical functions with `tikzpicture` directly in latex. and how to colourise and label them.

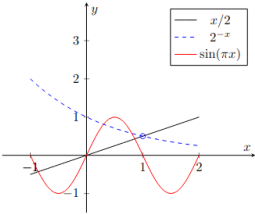
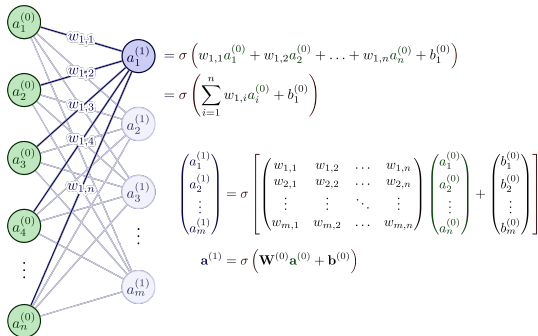


Figure 1: Graphs of three analytical functions.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

$y = x^2 - 2x + 3$	$y = x^2 - 2x + 1$	$y = x^2 - 2x - 3$
$\Delta = b^2 - 4ac$ $= (-2)^2 - 4 \cdot 1 \cdot 3$ $= -8$	$\Delta = b^2 - 4ac$ $= (-2)^2 - 4 \cdot 1 \cdot 1$ $= 0$	$\Delta = b^2 - 4ac$ $= (-2)^2 - 4 \cdot 1 \cdot (-3)$ $= 16$
$\Delta < 0$	$\Delta = 0$	$\Delta > 0$
không cắt trục $x$	tiếp xúc trục $x$	cắt trục $x$

# Introduction to $\text{\LaTeX}$



Esta template de  $\text{\LaTeX}$  viene preparada con muchos paquetes útiles, ya sea para escribir resoluciones matemáticas, importar imágenes, figuras, códigos, crear hipervínculos, signos matemáticos y mucho más. La he preparado durante mis últimos 2 años en la universidad, para poder entregar trabajos ordenados y completos. Ha sido probar muchos paquetes, ver errores, solucionarlos, editar y personalizar estilos hasta al fin encontrar algo que me guste y poder compartir con los demás para que puedan ocuparlo directamente o tener una base bien estructurada para poder crear sus propias templates, espero sea de utilidad para cualquiera que llegue hasta acá<sup>1</sup>.

## Versión 0.4.2

Actualmente mantengo 2 versiones de esta misma template, y cada número tiene su significado. El 0 es que sigue siendo una versión **en edición**, en el momento que llegue a la versión 1 considerare que ya está finalizada. El 4 es por la edición, esta es la cuarta gran edición que he realizado. El 2 viene de la cantidad de columnas en la template, siendo esta la versión de 2 columnas. Por lo que la versión 0.4.2 es la cuarta edición de dos columnas aún mantenida.

## Comandos personalizados

Hay par de comandos personalizados que están un poco más arriba en el código (pienso incluir varios), y que ayudan con operadores en mecánica cuántica, astronomía y cálculo.

Es cierto que algunos comandos vienen ya en otros paquetes, sin embargo, quería que esta template tuviera sólo lo necesario, por eso a medida que voy necesitando nuevos comandos, yo mismo los voy creando como comando personalizado. Aquí algunos ejemplos de operadores bra y ket de mecánica cuántica:

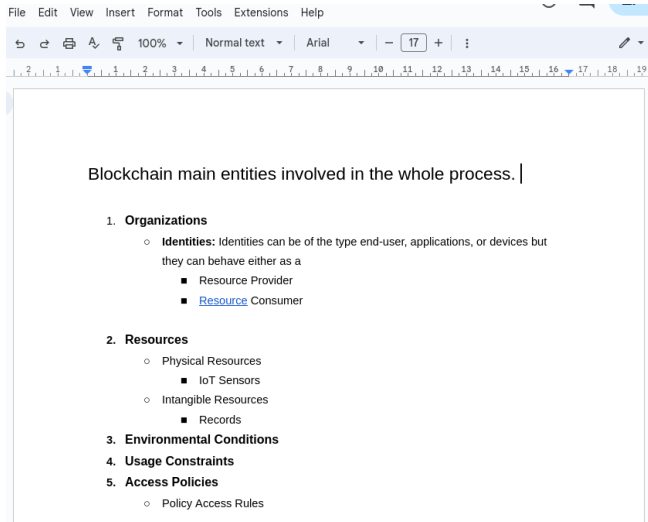
Ejemplos del comando probabilidad, valor absoluto y evaluar integral:

$$\begin{aligned} \text{Prob}(|-1\rangle) &= | \langle -1 | \psi \rangle |^2 \\ &= \left| \frac{1}{\sqrt{2+\gamma^2}} \frac{\sqrt{2}-\gamma}{\sqrt{2}} \right|^2 \\ &= \frac{1}{2+\gamma^2} \frac{2-2\sqrt{2}\gamma+\gamma^2}{2} \\ B(y_0) &= -\frac{I\mu_0}{4\pi} \int_{-\frac{L}{2}}^{\frac{L}{2}} \frac{y_0}{(y_0^2+z^2)^{\frac{3}{2}}} dz \\ &= -\frac{I\mu_0}{4\pi} \frac{z}{y_0 \sqrt{z^2+y_0^2}} \Big|_{-\frac{L}{2}}^{\frac{L}{2}} \\ B(y_0) &= -\frac{I\mu_0}{2\pi y_0} \frac{L}{\sqrt{L^2+4y_0^2}} \end{aligned}$$

Y finalmente ejemplos de comando unidad y unidades de medida astronómicas:

$$G = 4.3 \times 10^{-6} \left[ \frac{Km^2 Kpc}{s^2 M_{\odot}} \right] \quad L = 2^{3.5} = 11.3 [L_{\odot}]$$

# Introduction to L<sup>A</sup>T<sub>E</sub>X

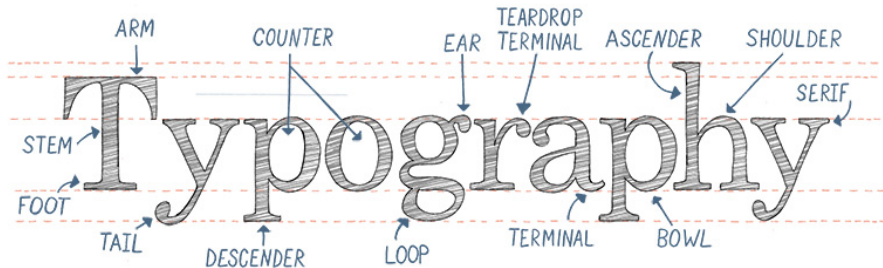


The screenshot shows a LaTeX editor window with a menu bar (File, Edit, View, Insert, Format, Tools, Extensions, Help) and a toolbar with icons for undo, redo, print, and font settings. The font is set to Arial, size 17. The document content is as follows:

Blockchain main entities involved in the whole process. |

1. **Organizations**
  - **Identities:** Identities can be of the type end-user, applications, or devices but they can behave either as a
    - Resource Provider
    - [Resource](#) Consumer
2. **Resources**
  - Physical Resources
    - IoT Sensors
  - Intangible Resources
    - Records
3. **Environmental Conditions**
4. **Usage Constraints**
5. **Access Policies**
  - Policy Access Rules

# Introduction to $\text{\LaTeX}$



L<sup>A</sup>T<sub>E</sub>X



# Introduction to $\text{\LaTeX}$

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## Key Features:

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## Benefits:

- Produces high-quality output
- Eliminates manual layout adjustments
- Perfect for academic papers and technical reports

Why not use MS-Word?



# MS-Word vs $\text{\LaTeX}$

Feature	MS Word	LaTeX
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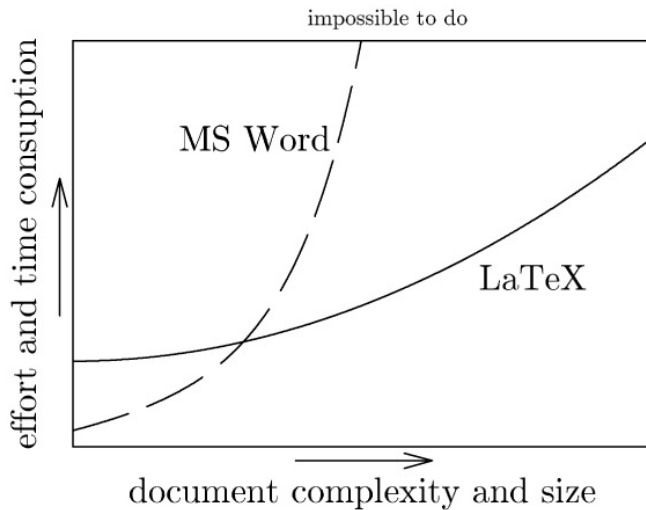
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Cost	Requires a <b>paid</b> license	<b>Free</b> & open-source

# Learning Curve



# Latex Editors

## Offline:

- TeXstudio
- MikTeX
- TexLive
- TeXworks
- TexMaker
- TeXnicCenter
- Gummi
- Lyx

## Online:

- Overleaf
- ShareLatex
- Papeeria
- CoCalc
- LatexBase
- LatexLab
- Sciweavers
- Authorea

# Why Choose Overleaf?

- **Access to Latest Packages:** Up-to-date packages, no installation needed
- **Automatic Compilation & Preview:** Instant preview helps quickly fix errors
- **Real-Time Collaboration:** Edit simultaneously with co-authors
- **Version Control & History:** Track changes and revert to any previous version
- **Extensive Template Library:** Ready-made journal, resume, & thesis etc.
- **User-Friendly Interface:** Intuitive for beginners with rich-text editing mode
- **Integrations:** Sync with Git, Dropbox, and Google Drive



# LaTeX First Documents

```
\documentclass{article}
\title{Introduction to LaTeX}
\author{Muhammad Yasar Khan}
\begin{document}
  \maketitle
  Hello, World!
\end{document}
```

## Introduction to LaTeX

Muhammad Yasar Khan

October 26, 2024

Hello, World!



# Latex Commands

- LaTeX commands begin with a backslash, followed by big or small letters.

`\command[optional Arguments]{Arguments}`

- There could be several arguments, each of them in braces or brackets.
- Some Arguments in curly braces are mandatory.

# Latex Packages

- `\usepackage` allows you to add extra functionality to your LaTeX document

`\usepackage[optional Arguments]{Package name}`

- `\usepackage{graphicx}`, `\usepackage{amsmath}`, `\usepackage{xcolor}`
- Packages are distributed via the [Comprehensive TeX Archive Network \(CTAN\)](https://www.ctan.org)<sup>1</sup>, hosting over 6,200 packages from nearly 2,900 contributors

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<sup>1</sup><https://www.ctan.org>



Lets Begin!

