



# Introducción a LaTeX

Emilio Sandoval

[emilio.sandpal@gmail.com](mailto:emilio.sandpal@gmail.com)

Febrero 2023

# LaTeX

[Lah-tekh] software

---

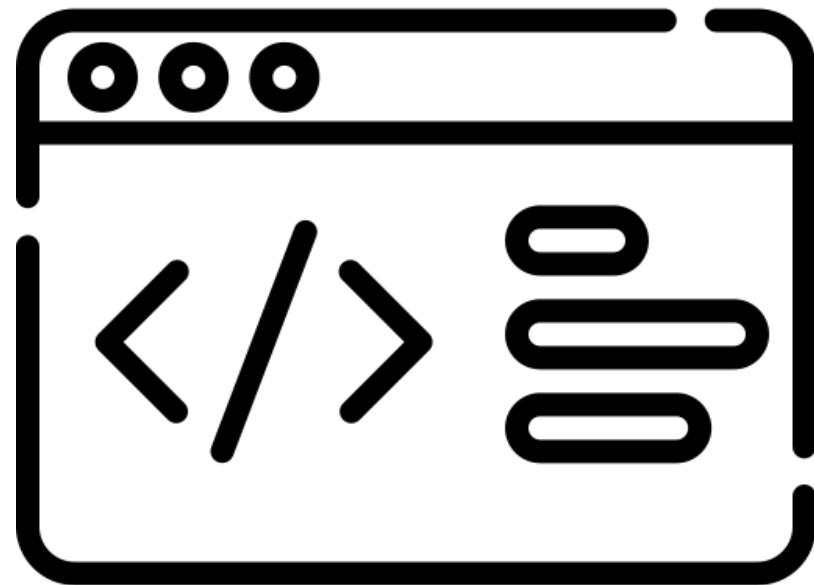
Lenguaje de etiquetas útil para la preparación principalmente de documentos técnicos y científicos

# Topics

- Introducción teórica a LaTeX
- Ventajas / Desventajas
- Overleaf
- Primeros pasos
  - Estructuras simples
  - Objetos
  - Ensayos

# LaTeX

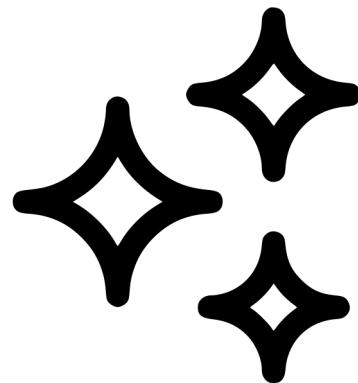
- Lenguaje de etiquetas
- Procesamiento de texto científico



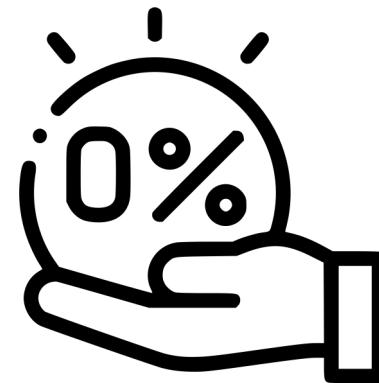
# Por qué usar LaTeX

$$f(x) = \sqrt{xy^2}$$

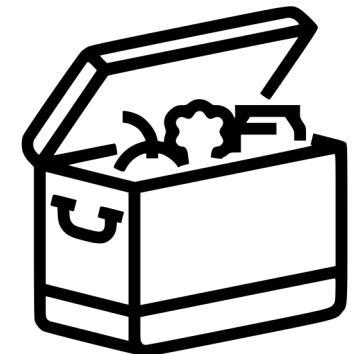
Notación matemática  
fácil de integrar



Bello

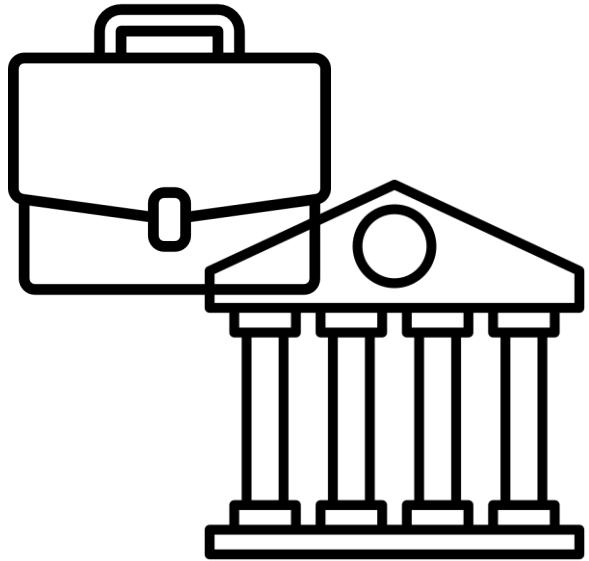


“Gratis”

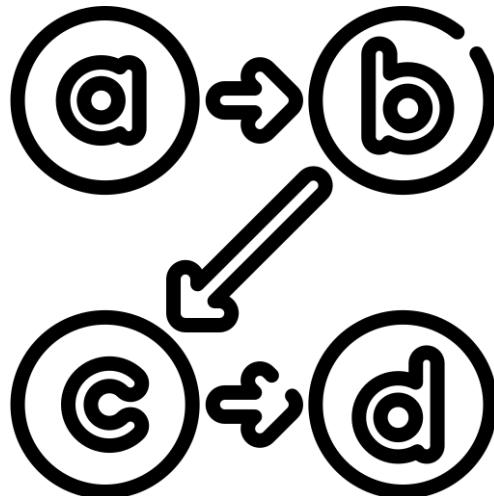


Portable, compatible,  
flexible y versátil

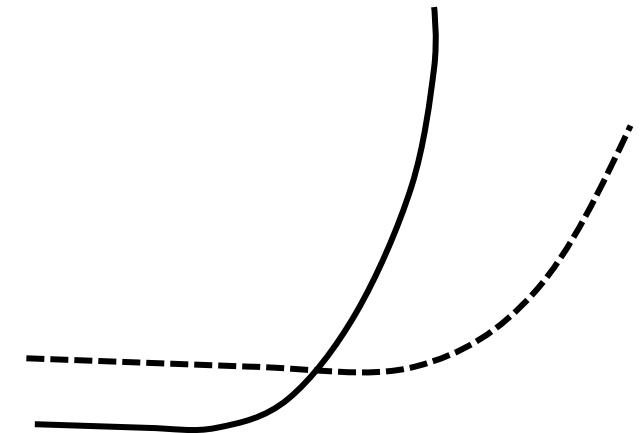
# Cuando no usar LaTeX



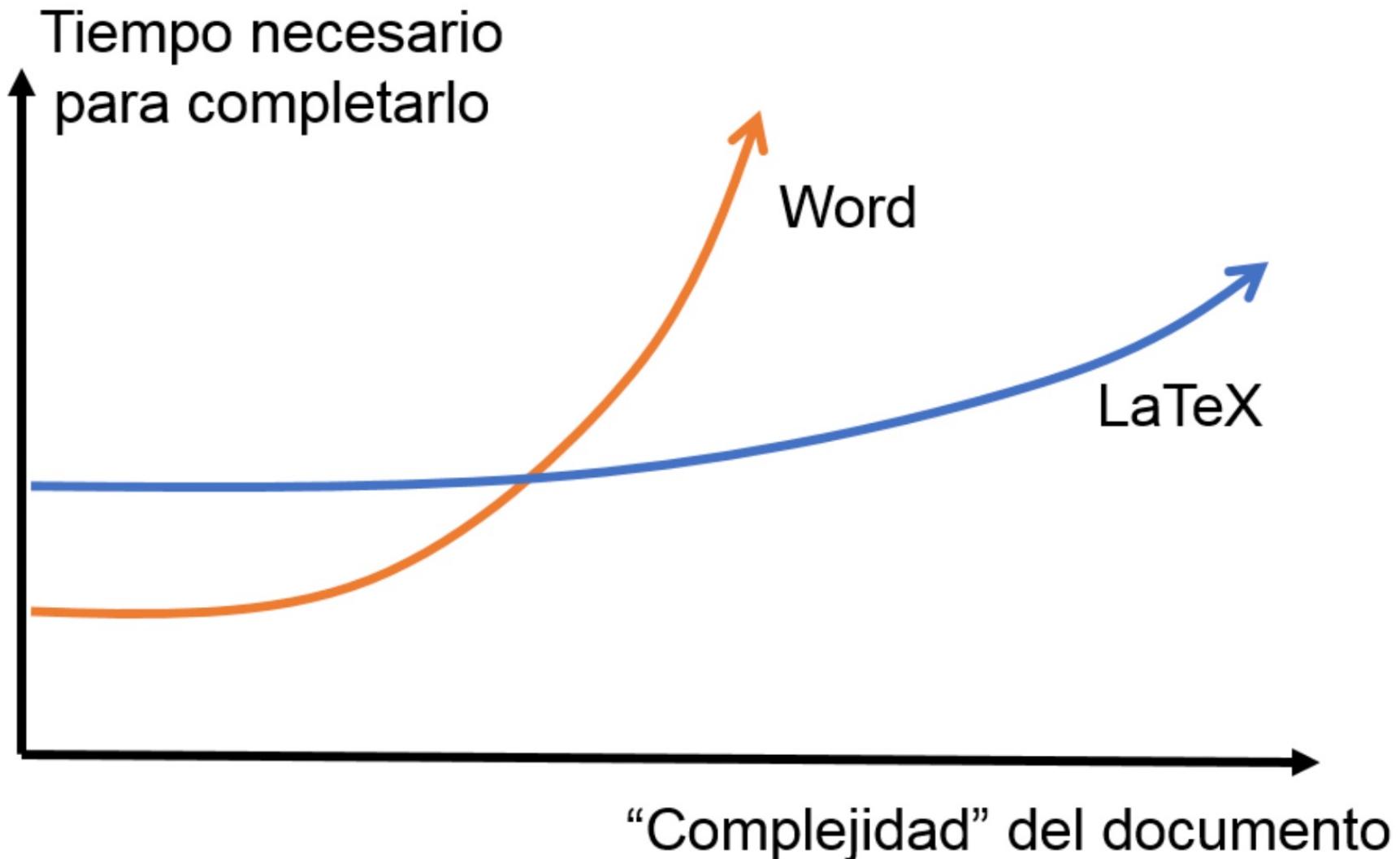
Académico ≠ práctico



Forza al autor a enfocarse  
en una estructura lógica



Curva de aprendizaje > utilidad



# Long-Short Term Memory Network in Commodities to Equities Ratio Using a TensorFlow Model

EMILIO SANDOVAL PALOMINO<sup>1</sup>

<sup>1</sup>Universidad Nacional Autónoma de México, Facultad de Economía  
<sup>1</sup>emiliosand@comunidad.unam.mx

Compiled on July 19<sup>th</sup>, 2021

In financial markets, ratios can describe significant relationships between two variables or indexes as in our case. The commodities to equities ratio shows that when the ratio is high, return on equity investment is higher than investment return on commodities, and when ratio is low, investment return on equity is lower than returns on commodities. For the purpose to forecast on next periods we have trained a univariate Long-Short Term Memory (LSTM) Recurrent Neural Network with 6 layers and 204,337 trainable parameters using pre-built classes from TensorFlow. Daily data from 1999 until recent days has been recollected, choosing to use 70% of data for training and 30% of data for testing. © 2022 UNAM

**Keywords:** Memory, Index, Strategy  
**JEL Classification:** C22, C63

<http://doi.org/10.6084/m9.figshare.15020679>

## 1. INTRODUCTION

The complexity in financial markets has led us trying to find patterns and relationships, sometimes linear and some other non-linear, in order to beat the market by applying an investment strategy. There are relationships that for some periods remain hidden among investors who pay most of their attention to other ratios and models. It is usual that, when events lead to some metrics appear in the public eye of investor, it may be too late to mitigate any risk, due to the big difficulty for anyone to track every metric in the market. In this specific case, we focus on a simple ratio and its components to try to predict future values.

What we made, despite the huge uncertainty that remains intrinsic to complex systems and so for the complex financial markets, was to approximate a Long-Short Term Memory Model to a Naive Base Model that has autocorrelation among its residuals, and try to approximate the mean absolute error and get that value as low as possible

## 2. MARKET'S PERSPECTIVE

So, why should we worry about taking a position in commodities and not in any other financial asset that may be less risky and more profitable? According to Crescat Capital, "...low commodity prices are the major reason for why we haven't seen high reported inflation yet".

### A. 2019 Q4

By the last quarter of 2019, the market's perspective was bullish, which meant stocks were overvalued, central banks were expanding their balance sheet, but despite all of that, political tensions were rising, and there was a huge difficulty for investors to find a "long-term" investment asset. The US treasury curve had negative real yields, and utilities were only 40 basis points over inflation rates. Due to this scenario, commodities were the only "only value-oriented asset class in the market" [2].

### B. 2020 Q1

By the time 2020 began, oil prices were hit by geopolitical conflicts causing an excessive pessimism around investors. Having said that, we must consider that oil and its derivatives is one of the most traded assets around the globe, so they undoubtedly hit the Commodities to Equities ratio. Also, short-term investments were substantial in most portfolios. Despite that, commodities would likely outperform equities in the near term [1]

### C. 2020 Q4

By this time, the opportunity of "buying historically undervalued commodity related assets" was profitable [3]. Commodities prices were hit by the Covid-19 pandemic, which made demand for basic consumables, either by producing or consuming, were at the lowest levels. By the end of 2020, demand and supply were rising at levels before the pandemic arrived.

### D. March 2021

By this time inflation is at least in the financial narrative around investors and the economy. The bullish perspective seems to be quite fragile and at the same time news, reports and analysis consider that the market it is getting its previous levels. Equity has been at its highest but at the same time demand on commodities has raised and so its prices.

Estructuras complejas (footnotes, referencias, tabla de contenidos, bibliografías, etc) pueden ser fácilmente generadas

Ayuda a practicar código

## Primeros pasos



- Gratuito
- Trabajo en equipos
- Fácil compilación



```
\documentclass[12pt, letterpaper,  
twoside]{article}
```

```
\title{Reporte de Econometría}  
\author{Emilio Sandoval}  
\date{}}
```



```
\begin{document}
```

```
\maketitle
```

Hola mundo!, está es nuestra primera línea en LaTeX.

```
\end{document}
```



```
\begin{document}
```

```
\maketitle
```

```
% Todo texto va después del \maketitle
```

```
Hola mundo!, está es nuestra primera línea en LaTeX.
```

```
\end{document}
```



```
\begin{document}

\maketitle

% Todo texto va después del \maketitle
Hola mundo!, está es nuestra \textbf{primera línea} en LaTeX.

Se necesita hacer \textit{enfasis}

o subrayar \underline{algo}

\end{document}
```

```
\begin{document}
```

```
\maketitle
```

```
\section{Introducción}
```

```
% Todo texto va después del \maketitle
```

```
Hola mundo!, está es nuestra \textbf{primera línea} en LaTeX.
```

```
Se necesita hacer \textit{enfasis}
```

```
O subrayar \underline{algo}
```

```
\section*{Introducción}
```

```
\end{document}
```



\begin{}

\end{}



```
\begin{equation}  
y = mx+b  
\end{equation}
```

o bien:

```
\begin{equation*}  
y = mx+b  
\end{equation*}
```



\usepackage{}



\subsection{}



```
\includegraphics{*.jpeg}
```



```
\includegraphics[width=0.4\textwidth]{*.jpeg}
```



\ref{eq:pitágoras}

\ref{fig:figural}



\href{https://www.google.com/}{Página oficial de Google}



\newpage

\centering



```
\begin{figure}[h]
    \centering
    \includegraphics[width=0.9\textwidth]{*.jpeg}
    \caption{Regresión Múltiple}
    \label{fig:RegMult}
\end{figure}
```



```
\begin{itemize}
    \item
    \item
\end{itemize}
```



```
\begin{enumerate}
    \item
    \item
    \item
\end{enumerate}
```



\footnote{}



```
\usepackage{geometry}
\geometry{
    a4paper,
    total={170mm,257mm},
    left=20mm,
    top=20mm,
}
```



\subsubsection{}



```
\begin{abstract}
```

```
\end{abstract}
```



\vspace{5mm}



\newline

o bien:

\\\



```
\begin{center}
\begin{tabular}{ c c c }
cell1 & cell2 & cell3 \\
cell4 & cell5 & cell6 \\
cell7 & cell8 & cell9
\end{tabular}
\end{center}
```



```
\begin{document}
```

```
\maketitle
```

```
\tableofcontents
```



```
\addcontentsline{toc}{section}{\numberline{} Primera sección}
```



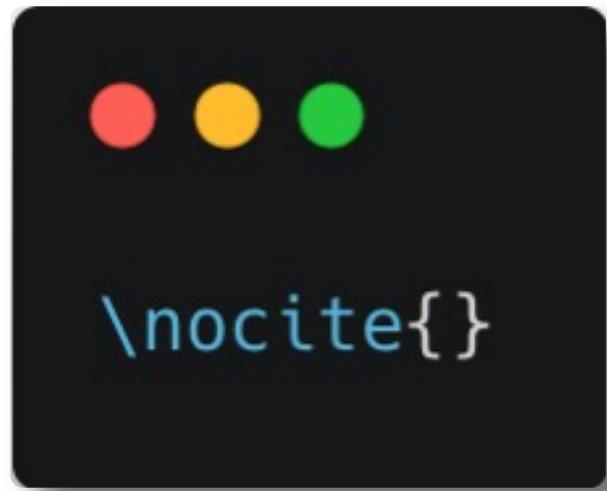
```
\renewcommand{\contentsname}{Contenido}
```



```
\begin{verbatim}
print("Hola mundo")
\end{verbatim}
```



```
\usepackage[style=numeric]{biblatex}  
\addbibresource{biblio.bib}
```





```
\printbibliography
```



\documentclass[12pt]

\documentclass[10pt]



```
@book{,  
    title=  
    author=  
    publisher=  
    series=  
    edition=  
    month=  
    year=  
    address=  
}
```



```
@article{,  
    title=  
    author=  
    journal=  
    volume=  
    number=  
    pages=  
    year=  
    publisher=  
}
```



```
@online{,  
    author =  
    editor =  
    title =  
    url =  
    urldate =  
}
```



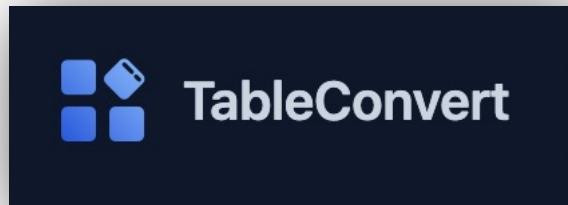
```
\usepackage{multicol}

\begin{multicols}{2}

\vfill
\columnbreak

\end{multicols}
```

## Recursos



Convierte  
tablas de excel  
a LaTeX



Detección de  
caractéres



Guía de  
símbolos



**Mohammad Shahrad** @MShahrad · 6 jul.

...

LaTeX is a perfect demonstration of the butterfly effect. You remove a comma on page 1 and a paragraph is moved on page 10. It's painfully beautiful!



129



1.334



13,7 mil





Al final, el diseño es lo que importa, no la herramienta.