UNIVERSIDAD DE GRANADA

Procesamiento de Señales Biomédicas

Grado en Ingeniería Electrónica Industrial

Taller 1. LaTeX

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Qué es LaTeX

Document.tex - TeXworks

File Edit Search Format Typeset Scripts Window Help

pdfLaTeX+MakeIndex+BibTeX

```
% DOCUMENT CLASS
\documentclass[11pt,english]{article}

% PACKAGES
\usepackage[utf8]{inputenc}  % ojo a la codificacion: UTF8 (utf0 en preferencias de texworks) o Latin 1 (ISO-8859-1)
\usepackage{amsmath,amsfonts,amssymb}
\usepackage{natbib}
\usepackage[pdftex]{graphicx}
\usepackage{epstopdf}
\usepackage{url}
\usepackage{textcomp}
\usepackage{enumerate}
\usepackage[cm]{fullpage}
\setlength{\parskip}{0.5ex}

% TITLE
\title{My first \LaTeX{} template}

% AUTHORS
\author{Mickey Mouse$^1$, Donald Duck$^{1,2}$ \\ \\ \emph{$^1$Department of Linguistics, Macquarie University, Sydney, Australia} \\ \emph{$^2$Parliament House, Canberra, Australia}}

% DOCUMENT
\begin{document}

% Create the title and the table of contents
\maketitle{\small \tableofcontents}

% Abstract
\begin{abstract}
Summary of the document.
\end{abstract}

% Section that shows how to place a figure and a table using two subsections
\section{Figures \& tables}

This section shows how to place a `\textbf{figure}' and a ``\emph{table}" in two different subsections. Note how to use \emph{italics} and \textbf{bold}, and that I use a `clearpage' command to go to the next page.

\subsection{How to place a figure}

Figure~\ref{Fig1} shows...

\begin{figure}[!b]
\begin{center}
\includegraphics[width=2.5cm]{Figures/DonaldDuck}
\caption{Caption of this figure.}
\label{Fig1}
\end{center}
\end{figure}

\clearpage

\subsection{How to place a table}

Table~\ref{Tbl1} shows...

\begin{table}[!htbp]
\begin{center}
	\begin{tabular}{|r||}
		\hline
		7C0 & hexadecimal \\
		3700 & octal \\
		\cline{2-2}
		11111000000 & binary \\
		\hline
		1984 & decimal \\
		\hline
	\end{tabular}
```

CRLF UTF-8 Line 1 of 122; col 0

Document.pdf - TeXworks

File Edit Search View Typeset Scripts Window Help

My first LaTeX template

Mickey Mouse[1], Donald Duck[1,2]

[1]*Department of Linguistics, Macquarie University, Sydney, Australia*
[2]*Parliament House, Canberra, Australia*

July 7, 2017

Contents

Abstract

Summary of the document.

1 Figures & tables

This section shows how to place a '**figure**' and a "*table*" in two different subsections. Note how to use *italics* and **bold**, and that I use a 'clearpage' command to go to the next page.

1.1 How to place a figure

Figure 1 shows...

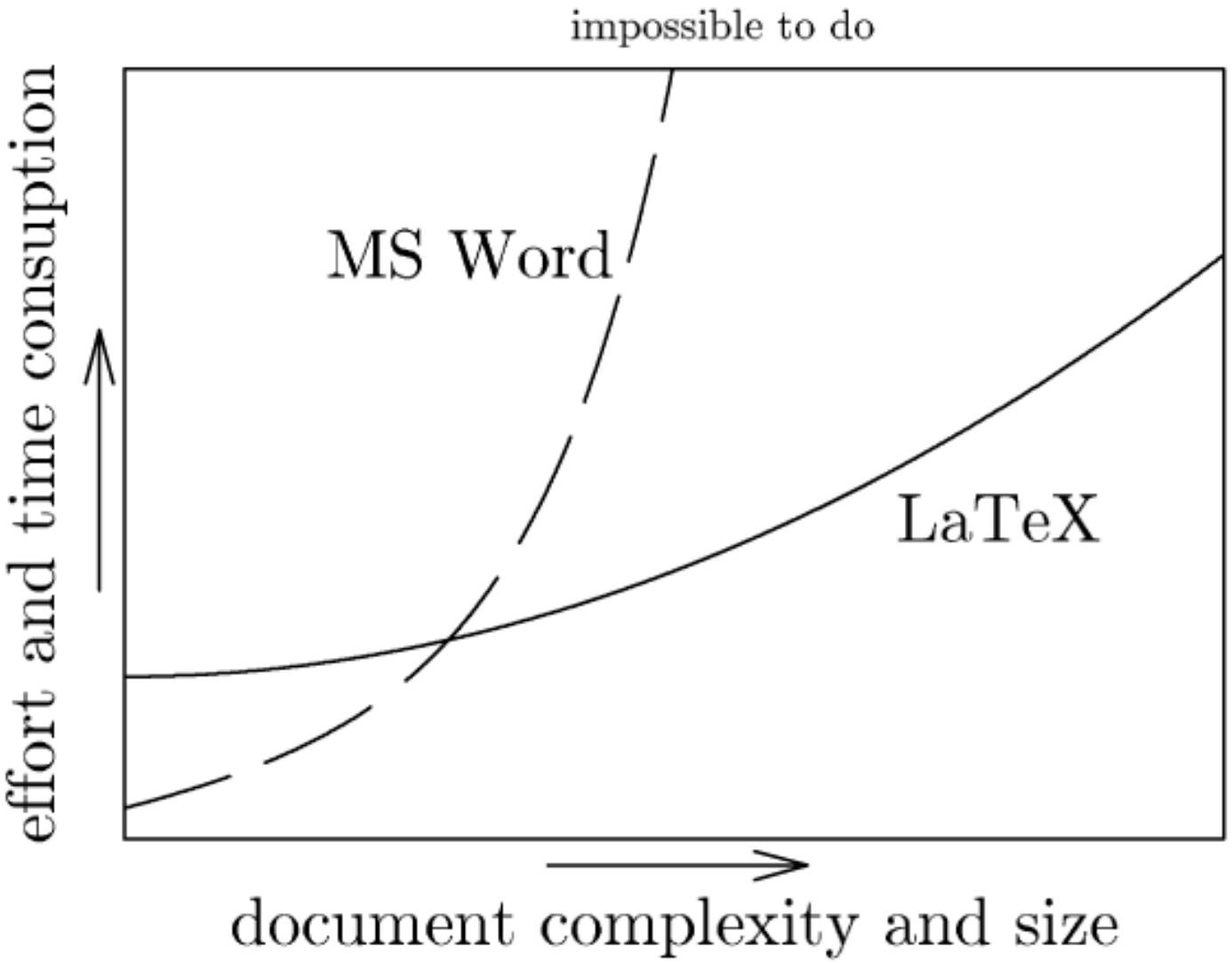
Figure 1: Caption of this figure.

89.6% page 1 of 2

ENG 9:20 AM 20/07/2017

¿Por qué necesito LaTeX?

- Te centras en el contenido, no en el formato.
- Las fuentes son bonitas y profesionales.
- Gestiona de manera muy eficiente referencias, índices, listas de figuras…
- La visualización de ecuaciones matemáticas es prácticamente perfecta.
- La licencia es gratuita.
- Fácil de aprender, con multitud de foros y ejemplos que ayudan a resolver dificultades técnicas.
- LaTeX es especialmente apropiado en documentos complejos


impossible to do
MS Word
LaTeX
effort and time consuption
document complexity and size

¿Qué vamos a aprender hoy?

- Estudiaremos algo de **Teoría**
  - ✓ Primeros pasos, elementos principales y filosofía de LaTeX
  - ✓ Cómo insertar una figura
  - ✓ Cómo crear tablas
  - ✓ Cómo crear una lista
  - ✓ Cómo enfatizar texto: *itálica*, **negrita**, subrayado
  - ✓ Cómo insertar ecuaciones matemáticas
  - ✓ Cómo referenciar figuras, tablas, secciones y fuentes bibliográficas
- Y afianzaremos lo aprendido con algo de **Práctica**
  - ✓ Instalación de MiKTeX
  - ✓ Tu primer documento en LaTeX

Estructura de un documento LaTeX

```
\documentclass{...}
\usepackage{...}
\begin{document}
\end{document}
```

- Ejemplo de un documento muy simple

```
\documentclass{article}
\begin{document}
Small is beautiful.
\end{document}
```

\documentclass[options]{class}

Document Classes.

`article` for articles in scientific journals, presentations, short reports, program documentation, invitations, ...

`proc` a class for proceedings based on the article class.

`minimal` is as small as it can get. It only sets a page size and a base font. It is mainly used for debugging purposes.

`report` for longer reports containing several chapters, small books, PhD theses, ...

`book` for real books

`slides` for slides. The class uses big sans serif letters. You might want to consider using the Beamer class instead.

Document Class Options.

`10pt`, `11pt`, `12pt` Sets the size of the main font in the document. If no option is specified, `10pt` is assumed.

`a4paper`, `letterpaper`, ... Defines the paper size. The default size is `letterpaper`. Besides that, `a5paper`, `b5paper`, `executivepaper`, and `legalpaper` can be specified.

`onecolumn`, `twocolumn` Instructs LaTeX to typeset the document in one column or two columns.

`twoside`, `oneside` Specifies whether double or single sided output should be generated. The classes `article` and `report` are single sided and the `book` class is double sided by default. Note that this option concerns the style of the document only. The option `twoside` does *not* tell the printer you use that it should actually make a two-sided printout.

\usepackage[options]{package}

```
\usepackage[spanish,es-tabla]{babel}
\usepackage{amsmath,amsfonts,amssymb}
\usepackage{natbib}
\usepackage{graphicx}
\usepackage[cm]{fullpage}
\usepackage[numbered,framed]{mcode}
\usepackage[colorlinks=true,allcolors=blue]{hyperref}
```

Dos preguntas importantes

- ¿Qué paquetes debo incluir?
- ¿Cómo instalo los paquetes?

Espacios

- Varios espacios consecutivos se ignoran.
- Los espacios al comienzo de una línea se ignoran.
- Una línea vacía define el final de un párrafo.

```
It does not matter whether you
enter one or several     spaces
after a word.

An empty line starts a new
paragraph.
```

It does not matter whether you enter one or several spaces after a word.

An empty line starts a new paragraph.

- ~ inserta un espacio duro (no separable) → Alt+126

```
Mr.~Smith was happy to see her\\
cf.~Fig.~5\\
```

Mr. Smith was happy to see her
cf. Fig. 5

Secciones, subsecciones, párrafos y capítulos

```
\section{...}
\subsection{...}
\subsubsection{...}
\paragraph{...}
\subparagraph{...}
```

```
\chapter{...}
```

```
\tableofcontents
```

Título

```
\title{...}, \author{...} and optionally \date{...}
```

```
\maketitle
```

Referencias cruzadas

`\label{marker}`, `\ref{marker}` and `\pageref{marker}`

```
A reference to this subsection
\label{sec:this} looks like:
``see section~\ref{sec:this} on
page~\pageref{sec:this}.''
```

A reference to this subsection looks like: "see section 2.8 on page 41."

Pies de página

`\footnote{footnote text}`

```
Footnotes\footnote{This is
  a footnote.} are often used
by people using \LaTeX.
```

Footnotes[a] are often used by people using LaTeX.

[a] This is a footnote.

Enfatizar texto

\underline{word}	<u>word</u>
\emph{word}	*word*
\textbf{word}	**word**
\textcolor[red]{word}	word

Entornos

```
\begin{environment}  text  \end{environment}
```

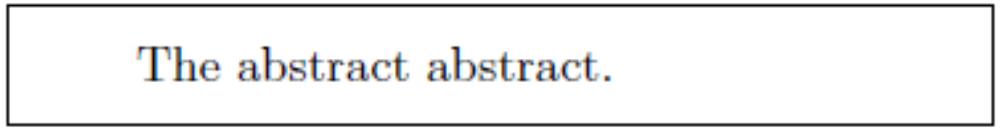
```
\begin{aaa}...\begin{bbb}...\end{bbb}...\end{aaa}
```

Los entornos más importantes son:

- document
- abstract
- itemize, enumerate and description
- figure
- tabular
- equation
- thebibliography

Abstract

```
\begin{abstract}
The abstract abstract.
\end{abstract}
```



itemize, enumerate, description

```
\begin{enumerate}
\item You can nest the list
environments to your taste:
\begin{itemize}
\item But it might start to
look silly.
\item[-] With a dash.
\end{itemize}
\item Therefore remember:
\begin{description}
\item[Stupid] things will not
become smart because they are
in a list.
\item[Smart] things, though,
can be presented beautifully
in a list.
\end{description}
\end{enumerate}
```

1. You can nest the list environments to your taste:
   - But it might start to look silly.
   - With a dash.
2. Therefore remember:

   Stupid things will not become smart because they are in a list.

   Smart things, though, can be presented beautifully in a list.

Figures

La figura~\ref{Fig1} muestra...

```
\begin{figure}[!htbp]
\begin{center}
\includegraphics[width=2.5cm]{Figuras/Figura3D}
\caption{Pie de figura.}
\label{Fig1}
\end{center}
\end{figure}
```

Elementos flotantes

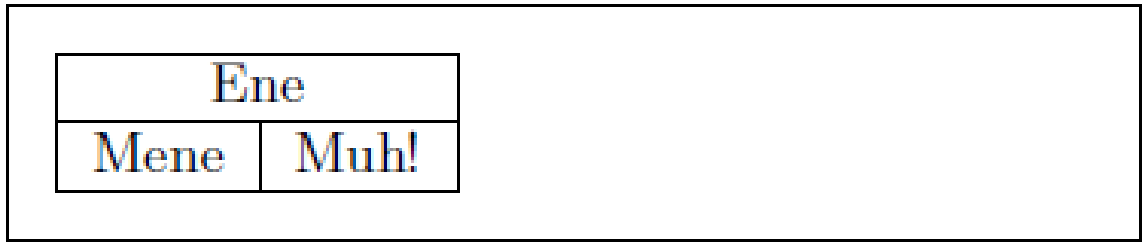
Float Placing Permissions.

Spec	Permission to place the float ...
`h`	*here* at the very place in the text where it occurred. This is useful mainly for small floats.
`t`	at the *top* of a page
`b`	at the *bottom* of a page
`p`	on a special *page* containing only floats.
`!`	without considering most of the internal parameters[a], which could otherwise stop this float from being placed.

[a] Such as the maximum number of floats allowed on one page.

Tabular

```
\begin{tabular}{|c|c|}
\hline
\multicolumn{2}{|c|}{Ene} \\
\hline
Mene & Muh! \\
\hline
\end{tabular}
```



Ene	
Mene	Muh!

```
Table~\ref{Tbl1} shows...

\begin{table}[!htbp]
\begin{center}
\begin{tabular}{|r||l|}
\hline
7C0 & hexadecimal \\
3700 & octal \\
\cline{2-2}
11111000000 & binary \\
\hline
1984 & decimal \\
\hline
\end{tabular}
\caption{Caption of this table.}
\label{Tbl1}
\end{center}
\end{table}
```

Table 1 shows...

7C0	hexadecimal
3700	octal
11111000000	binary
1984	decimal

Table 1: Caption of this table.

Ecuaciones matemáticas

```
Add $a$ squared and $b$ squared
to get $c$ squared. Or, using
a more mathematical approach:
$a^2 + b^2 = c^2$
```

Add a squared and b squared to get c squared. Or, using a more mathematical approach: $a^2 + b^2 = c^2$

```
Add $a$ squared and $b$ squared
to get $c$ squared. Or, using
a more mathematical approach
 \begin{equation}
   a^2 + b^2 = c^2
 \end{equation}
Einstein says
 \begin{equation}
   E = mc^2 \label{clever}
 \end{equation}
He didn't say
 \begin{equation}
  1 + 1 = 3 \tag{dumb}
 \end{equation}
This is a reference to
\eqref{clever}.
```

Add a squared and b squared to get c squared. Or, using a more mathematical approach

$$a^2 + b^2 = c^2 \tag{3.1}$$

Einstein says

$$E = mc^2 \tag{3.2}$$

He didn't say

$$1 + 1 = 3 \tag{dumb}$$

This is a reference to (3.2).

```
\begin{equation*}
 P = \frac{\displaystyle{
   \sum_{i=1}^n (x_i- x)
   (y_i- y)}}
   {\displaystyle{\left[
   \sum_{i=1}^n(x_i-x)^2
   \sum_{i=1}^n(y_i- y)^2
   \right]^{1/2}}}
\end{equation*}
```

$$P = \frac{\displaystyle\sum_{i=1}^{n}(x_i - x)(y_i - y)}{\displaystyle\left[\sum_{i=1}^{n}(x_i - x)^2 \sum_{i=1}^{n}(y_i - y)^2\right]^{1/2}}$$

1 Greek and Hebrew letters

α	\alpha	κ	\kappa	ψ	\psi	$\digamma$	\digamma	Δ	\Delta	Θ	\Theta
β	\beta	λ	\lambda	ρ	\rho	ε	\varepsilon	Γ	\Gamma	Υ	\Upsilon
χ	\chi	μ	\mu	σ	\sigma	$\varkappa$	\varkappa	Λ	\Lambda	Ξ	\Xi
δ	\delta	ν	\nu	τ	\tau	φ	\varphi	Ω	\Omega		
ϵ	\epsilon	o	o	θ	\theta	ϖ	\varpi	Φ	\Phi	$\aleph$	\aleph
η	\eta	ω	\omega	υ	\upsilon	ϱ	\varrho	Π	\Pi	$\beth$	\beth
γ	\gamma	ϕ	\phi	ξ	\xi	ς	\varsigma	Ψ	\Psi	$\daleth$	\daleth
ι	\iota	π	\pi	ζ	\zeta	ϑ	\vartheta	Σ	\Sigma	$\gimel$	\gimel

Lista de símbolos matemáticos disponible: https://www.cmor-faculty.rice.edu/~heinken/latex/symbols.pdf

Bibliography

`\bibitem[label]{marker}`

`\cite{marker}`

‘thebibliography’ environment

```
Partl~\cite{pa} has
proposed that \ldots


\begin{thebibliography}{99}
\bibitem{pa} H.~Partl:
\emph{German \TeX},
TUGboat Volume~9, Issue~1 (1988)
\end{thebibliography}
```

Partl [1] has proposed that . . .

Bibliography

[1] H. Partl: *German TEX*, TUGboat Volume 9, Issue 1 (1988)

Oetiker *et al.* (2016) have prepared a very nice document to learn more about LaTeX. Another way to reference a paper from the references section is with (Oetiker *et al.*, 2016).

References

Zollner, C., Karnahl, T., Stange, G. (**1976**). "Input-output function and adaptation behaviors of the five early potentials registered with the earlobe-vertex pick-up," Archives of Oto-Rhino-Laryngology **212**, 23-33.

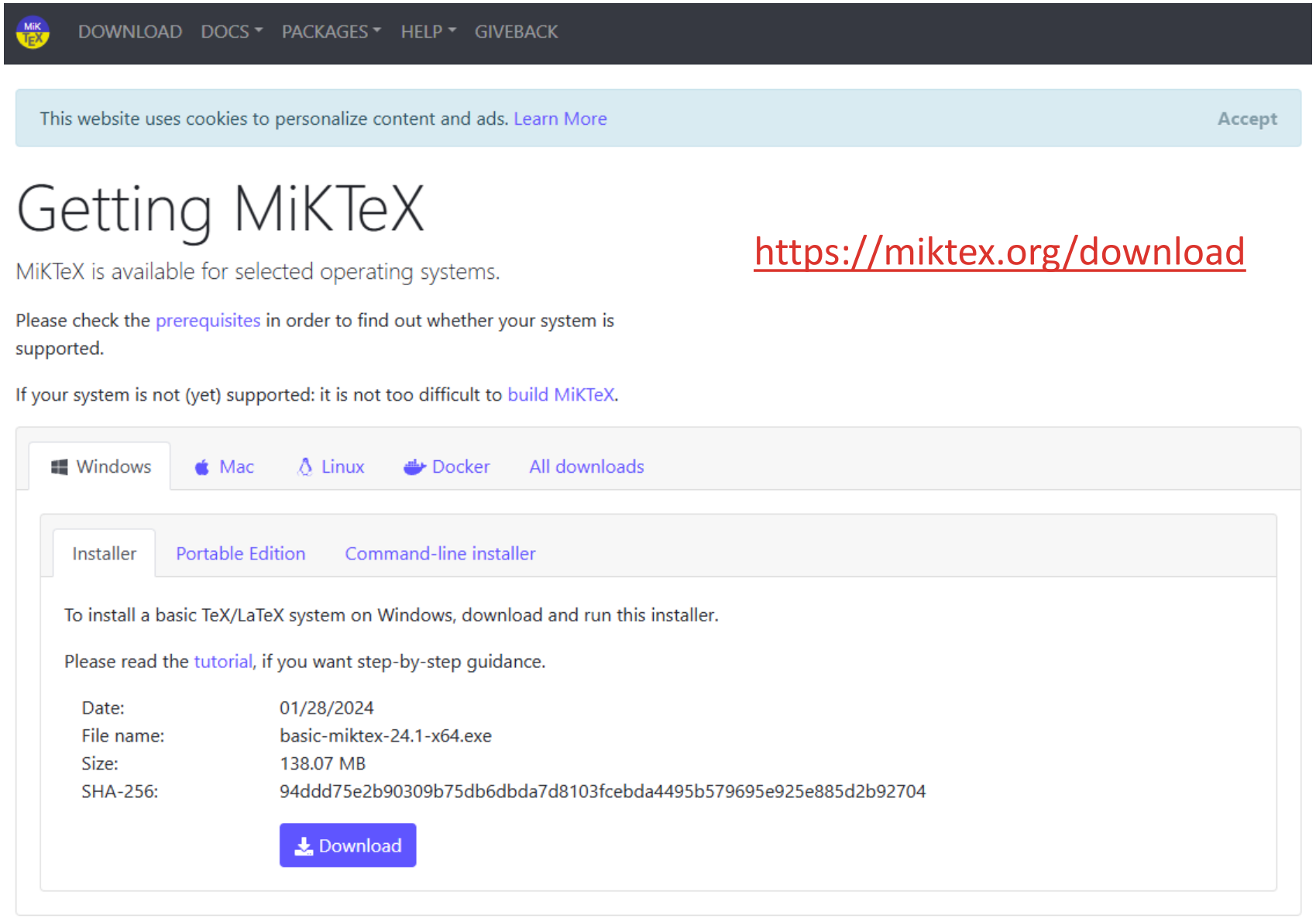
Oetiker, T., Partl, H., Hyna, I., Schlegl, E. (**2016**). "The Not So Short Introduction to LaTeX 2ϵ". Free Software Foundation, Inc.


```
\citet{Oetiker2016} have prepared a very nice document to learn more about \LaTeX{}. Another way to reference a paper from the references section is with \citep{Oetiker2016}.

\begin{thebibliography}{00}

\harvarditem[Zollner \emph{et al.}]{Zollner, Karnahl, and Stange}{1976}{Zollner1976}
Zollner, C., Karnahl, T., Stange, G. (\textbf{1976}). ``Input-output function and adaptation behaviors of the five early potentials registered with the earlobe-vertex pick-up,'' Archives of Oto-Rhino-Laryngology \textbf{212}, 23-33.

\harvarditem[Oetiker \emph{et al.}]{Oetiker, Partl, Hyna, and Schlegl}{2016}{Oetiker2016}
Oetiker, T., Partl, H., Hyna, I., Schlegl, E. (\textbf{2016}). ``The Not So Short Introduction to \LaTeX{} 2$\epsilon$''. Free Software Foundation, Inc.

\end{thebibliography}
```

Don't forget **natbib**

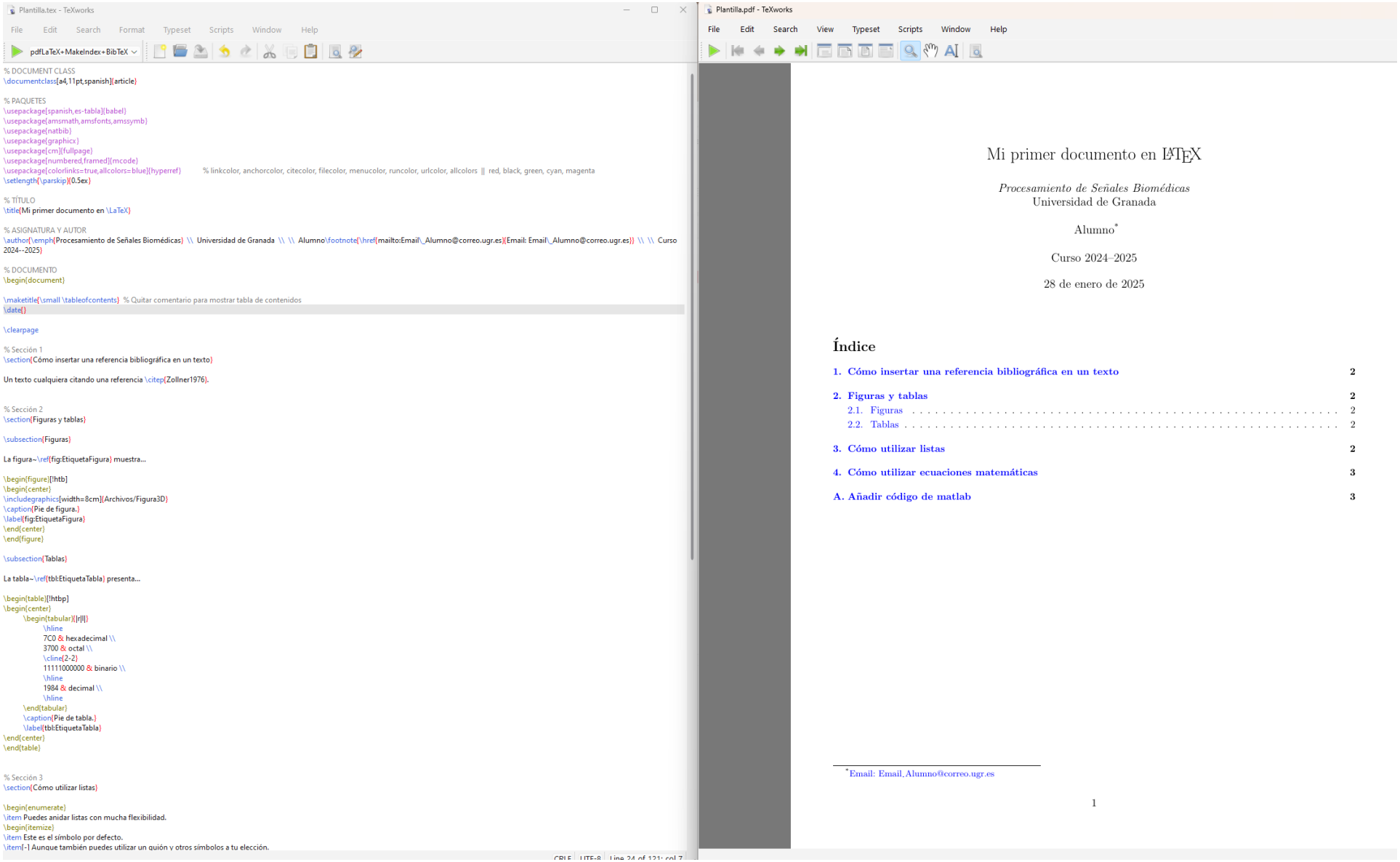
Parte práctica

Instalación de MiKTeX



https://miktex.org/download

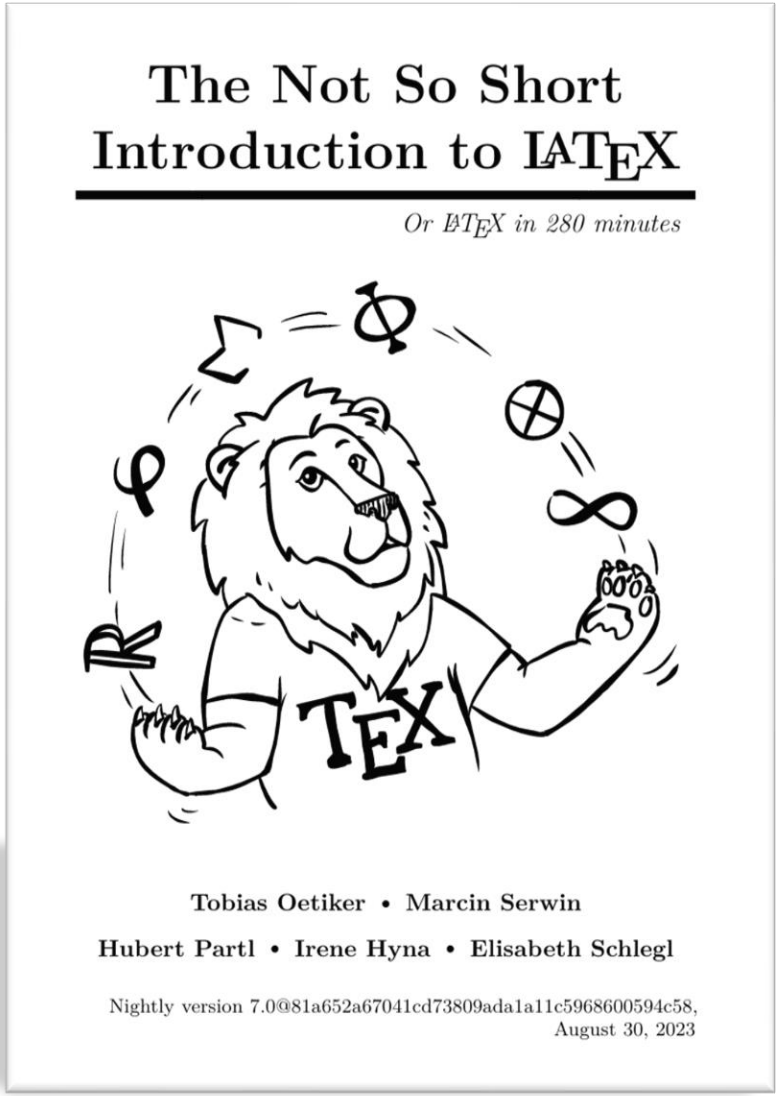
Compilación de una plantilla ejemplo



Tarea para casa

- Subir a PRADO un documento PDF de **tema libre** generado a partir de la plantilla proporcionada, que contenga:
  - ✓ un título, vuestro nombre, vuestro email como pie de página
  - ✓ al menos una figura,
  - ✓ al menos una tabla,
  - ✓ al menos una lista,
  - ✓ al menos una ecuación en texto y otra aislada en el centro de una línea,
  - ✓ un apéndice con un script de MATLAB,
  - ✓ algún fragmento de texto en **negrita**, subrayado y *cursiva*, y
  - ✓ al menos una referencia bibliográfica, una referencia a una tabla, una referencia a una figura y una referencia a una ecuación.
- Fecha límite: miércoles 5 de marzo, 2025.
- Calificación numérica de 0—10 en el apartado de evaluación continua.

Referencias



The not so short Introduction to LaTeX (2023). Oetiker T, Serwin M, Partl H, Hyna I, Schlegl E.

Available in Open Access
https://tobi.oetiker.ch/lshort/lshort.pdf