UNIVERSIDAD POLITÉCNICA DE MADRID

ESCUELA TÉCNICA SUPERIOR DE INGENIEROS DE TELECOMUNICACIÓN

ThesiX: latex template for high-quality document formatting with special emphasis on thesis manuscripts - V1.0

TESIS DOCTORAL

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Graduado en Ciencias Físicas

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INSTITUTO DE ENERGÍA SOLAR
Departamento de Electrónica Física, Ingeniería Eléctrica y Física Aplicada

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2019

Tribunal nombrado por el Magfco. Y Excmo. Sr. Rector de la Universidad Politécnica de Madrid.

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SUPLENTES:

Realizado el acto de defensa y lectura de la Tesis en Madrid,
el día _____ de _____ de 2019.

Calificación:

EL PRESIDENTE LOS VOCALES

EL SECRETARIO

Dedication if any

Famous quote if any.
Author

Acknowledgements

Acknowledgements if any.

Resumen

Resumen is Abstract in Spanish, but obviously it should be replaced by the corresponding word in the mother tongue of the author. In my opinion, this should be always before the Abstract, as probably the acknowledgements will be mostly written in the author's mother tongue. Therefore it make sense to put these two sections together, and leave the Abstract closer to the rest of the document which will be probably written in English. In any case this depends on the personal view of the user.

Abstract

Thesis abstract.

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List of Acronyms

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CHAPTER 1

Introduction

This chapter presents the thesis introduction.

The current scenario of the photovoltaic market is briefly reviewed, analysing the historical trends and future perspectives of the most important technologies.

This leads to the revision of the state-of-the-art of multijunction solar cells, on which this thesis focuses on. The three main approaches (new compound materials, metamorphic buffers and the wafer bonding technique) are analysed, summarizing their benefits and drawbacks.

The aforementioned revision set the basis to establish the thesis goals, which is devoted to enhancing the potential of multijunction solar cells by developing advanced architectures. One of the main pathways has been the traditional approach based on increasing the number of subcells, but other improvements such as the thinning of substrates or the use of graphene as a top contact have also been explored. Accordingly, a detailed explanation of the main objectives to be accomplished is provided.

Afterwards, the outline followed in the thesis to illustrate the work carried out is explained to ease the reader task of finding whatever required information.

Finally, the framework which has surrounded this thesis is described, accounting for the funding, the means provided by the group, colleagues or third party partners as well as the main achievements attained through this thesis.

1.1 About *ThesiX*

ThesiX was created during the redaction of my Ph.D. thesis. I found it difficult to find a LaTeX template that eases the template build up while being easily extensible and customizable. Although there are some good works available, all of them fail to provide an out of the box template, easy to understand and modify without strong design constraints. My purpose is that this template will be use as the basis of any other work, modifying this template as necessary. Even if it is design to work as it is, all users are highly encourage to learn at least a basic LaTeX and improve the template.

The latest template release is available at https://github.com/ilomdez/ThesiX for use under license GPL-3.0. It would be highly appreciated if the user thank the template availability explicitly stating in their document so, for instance by the use of the defined command "\ThankThesiX" or with any other sentence that fits better the user while maintaining the same meaning and explicitly staying the repository webpage and the *ThesiX* author name.:

This document make use of the latex template *ThesiX*, originally made by I. Lombardero and available at https://github.com/ilomdez/ThesiX.

ThesiX is its own manual and example, which means that the manual has been built using the *ThesiX* template. If the files are compiled as downloaded the output file will be this very same manual. Accordingly, several examples of all that can be achieved with *ThesiX* has been exemplified in the manual, so that every user can easily get examples of how to achieve most usual figures, tables or layouts in a thesis document.

I just would like to finish remembering that this is NOT a LaTeX manual and that every user is encourage to learn at least the basis by themselves. This is easily accomplished given the tremendous amount of information and tutorials available on-line. The LaTeX community has made an incredible effort during the last years so that everyone can learn on their own. In any case, *ThesiX* is built to be used by non-LaTeX users straightforward.

Any requirement or suggestion should be requested at the Github webpage or my LinkedIn personal webpage (https://www.linkedin.com/in/ilomdez/). In any case, *ThesiX* is an ongoing work which is carried out in my free-time and accordingly, its extension, readability, number of examples or level of detail will be improved when possible. Nevertheless, the LaTeX template is fully functioning and the main remaining work is to finish the manual.

1.2 Installation

In order to use *ThesiX* clone or download the whole repository at https://github.com/ilomdez/ThesiX. Compiling the code should be pretty straight forward, although some steps might vary depending on the operative system and the compiler chosen:

1.2.1 Windows - TextMaker - MikTex

This section has been tested under Windows 10, TexMaker 5.0.3 and MikTex 2.9.6972. The version of each package used in the compilation of the latest *ThesiX* manual can be found in the log file in the main folder of the repository.

Follow the instructions below:

1. Download the corresponding MikTex version (https://miktex.org/download) and install it.

2. Download the corresponding TexMaker version (https://www.xm1math.net/texmaker/) and install it.
3. Configure TexMaker as depicted in Figure 1.1.
4. If you want to make use of the commands to allow the use of svg images
5. If you want to make use of the commands to allow the use of tif images

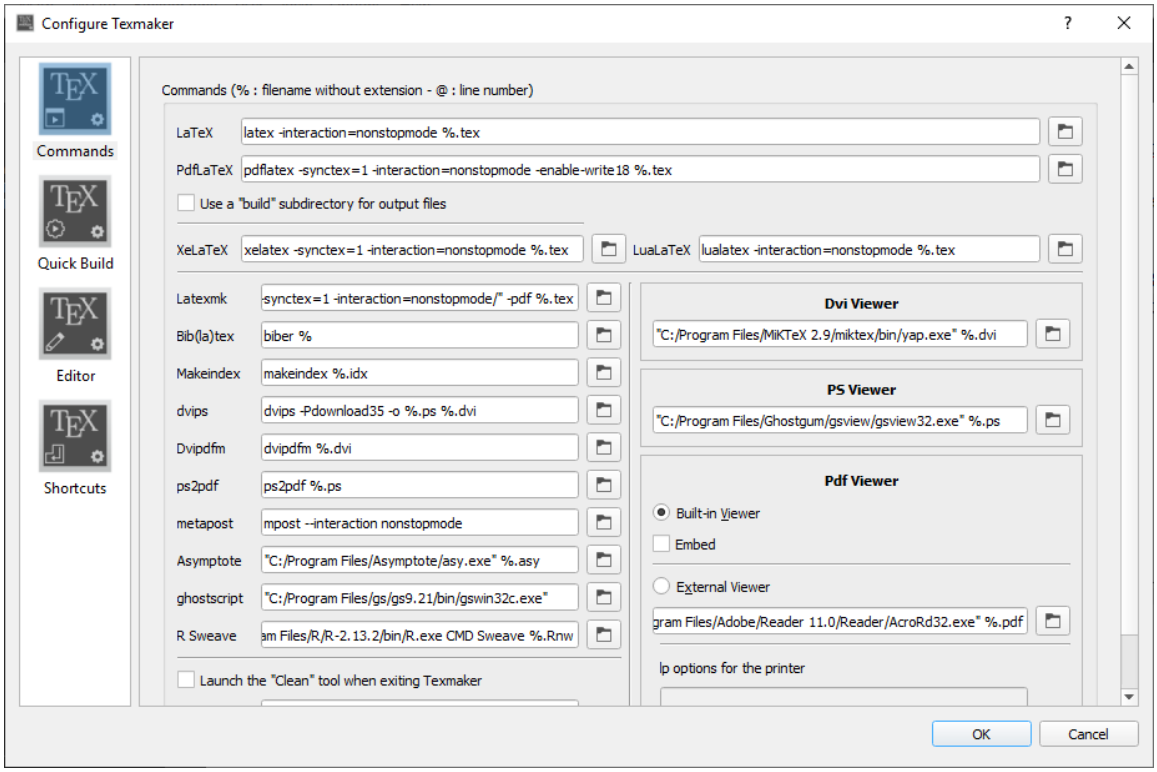


Figure 1.1: Screenshot of the main configuration settings in TexMaker.

1.2.2 Windows - TexStudio - MikTex

Coming soon!

1.2.3 Linux

Coming soon!

1.3 How to Use *ThesiX*

ThesiX have the following structure:

```
\documentclass[a4paper,11pt,openright]{book}
\input{settings/define_basic}
\input{settings/define_shortcut}
\input{settings/packages}
\input{settings/acronyms}
```

```
\input{settings/symbols}
%------------------------------------------------------------------
\begin{document}
\pagenumbering{gobble}
\input{covers/title}
\input{covers/titleb}
\blankpage
\input{covers/tribunal}
\blankpage
\input{covers/dedication}
\blankpage
\input{covers/phrase}
\blankpage
\input{settings/coverstyle}
\input{covers/acknowledgements}
\frontmatter
\input{covers/resumen}
\input{covers/abstract}
\input{covers/tableofcontents}
\mainmatter
\input{settings/chapterstyle}
\include{chapters/chapter_Intro}
%\include{chapters/chapter_DN}
%\include{chapters/chapter_MJ}
%\include{chapters/chapter_Ge}
%\include{chapters/chapter_NewArch}
\include{chapters/chapter_Elements}
\include{chapters/chapter_Statements}
%\include{example/CompilationChapter}
%------------------------------------------------------------------
\input{settings/coverstyle}
%%\include{chapters/future_works}
\appendix
%%\input{appendix/appendix_TCAD}
%%\input{appendix/appendix_Distributer}
%%\input{appendix/appendixC}
%%------------------------------------------------------------------
\input{bibliography/bibliography}
%\input{extrainfo/projects}
%\input{extrainfo/patents_awards}
------------------------------------------------------------------
\blankpage
\end{document}
```

1.4 Thesis outline

This manual explains every step from the installation to the compilation of the LaTeX template including the use of figures, lists, acronyms and many other useful elements to use in the course of any manuscript redaction. *ThesiX* is outline as follows:

- Chapter 1, *Introduction*, reviews .
- Chapter 2 reviews .
- Chapter 3 analyses zed.
- Chapter 4 the simulations.
- Chapter 5 analysed.
- Chapter 6 summarizes work.
- Appendix A thesis.
- Appendix B gives .

CHAPTER 2

Elements

Este capítulo contiene ejemplos de como realizar las principales acciones necesarias para redactar un documento, y con especial énfasis, una tesis.

Es conveniente recordar que es útil tener un capítulo que incluya los principales elementos, ya que es útil para asegurar la correcta compilación de todos los paquetes. Es decir, tener siempre un capítulo que incluya una referencia, un acrónimo, un símbolo, una tabla y una figura y utiliza todos la mayoría de los paquetes por lo que nos permite chequear que el documento está correctamente diseñado en todo momento sin ralentizar la compilación de este.

Sin más, sólo recordar que para reproducir cualquier utilidad aquí mostrada no hay más que copiar el código fuente y pegarlo en el lugar deseado del documento. Se incluye un resumen de los diferentes códigos sin explicación en el siguiente capítulo

En este capítulo se dividen por secciones lo principales elementos a incorporar en un documento. En cada sección se muestran las distintas posibilidades que se ofrecen para insertar nuevos elementos así como comentarios acerca de su uso, limitaciones o precauciones.

2.1 Figures

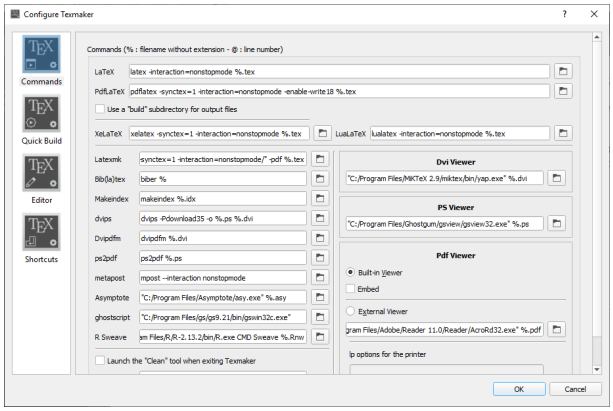
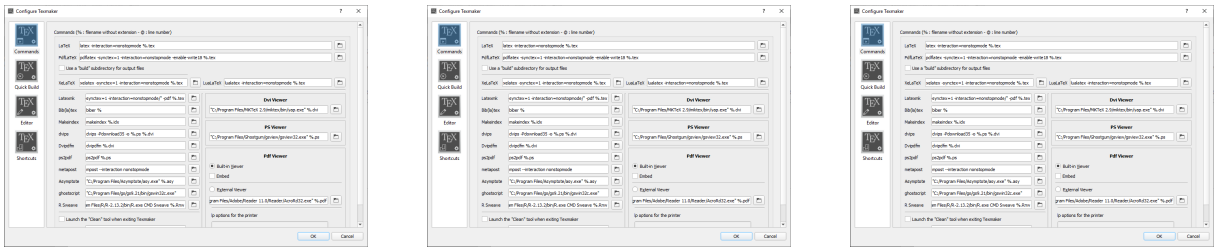


Figure 2.1: An example graph



(a) $y = x$ **(b)** $y = 3sinx$ **(c)** $y = 5/x$

Figure 2.2: Three simple graphs

in 2.1

2.2 Tables

A	B	C
1	2	3
4	5	6

Table 2.1: very basic table

2.3 Equations

Ecuaciones:

1. In-line equation:

   This is $E=mc^2$ in-line → This is $E = mc^2$ in-line

This is \$\frac{\frac{1}{x}+\frac{1}{y}}{y-z}\$ as well → This is $\frac{\frac{1}{x}+\frac{1}{y}}{y-z}$ as well

2. Numbered equation:

```
\begin{equation}\label{eq:someequation}
\sqrt[n]{1+x+x^2+x^3+\dots+x^n}
\end{equation}
```

$$\sqrt[n]{1+x+x^2+x^3+\cdots+x^n} \tag{2.1}$$

3. Unnumbered equation:

```
\begin{equation*}
\frac{n!}{k!(n-k)!} = \binom{n}{k}
\end{equation*}
```

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

2.4 Cites

1. Cita estándar:

   `\cite{Aho2015b}` → [Aho15]

2. Cita comentada:

   `\parencite[e.g.][page 300]{Hovel1997b}` → [e.g. HW97, page 300]

2.5 References

1. Referencia a figura:

   `\ref{fig:x svgsatement}` → **??**

2. Referencia a tabla:

   `\ref{tab:tablestatement}` → **??**

3. Equation reference:

   `\ref{eq:someequation}` → 2.1

4. Equation reference with parenthesis:

   `\eqref{eq:someequation}` → (2.1)

2.6 Acronyms and symbols

1. Símbolo:
   `\gls{symbol1}` → S_1
2. Acrónimo:
   `\gls{acronym1}` → AE1

2.7 Lists

Esto es una lista.

5. First points
6. Second
7. Etc

Esto es una lista.

CHAPTER 3

Statements

Este capítulo contiene ejemplos sin explicacion de los distintos elementos que se pueden utilizar en esta plantilla de LaTeX

La función de este capítulo no es explicar el uso ni el funcionamiento del código sino servir como referencia para poder copiar y pegar el código del elemento que se desee utilizar. Es conveniente recordar que es útil tener un capítulo que incluya los principales elementos, ya que es útil para asegurar la correcta compilación de todos los paquetes. Es decir, incluye una referencia, un acrónimo y utiliza todos la mayoría de los paquetes por lo que nos permite chequear que el documento está correctamente diseñado.

Sin más, sólo recordar que para reproducir cualquier utilidad aquí mostrada no hay más que copiar el código fuente y pegarlo en el lugar deseado del documento.

A continuación se muestran diferentes ejemplos para la inclusión de los principales elementos que se utilizarán a lo largo de la tesis: citas, acrónimos, símbolos, tablas, figuras y ecuaciones. Esta sección sólo incluye el código para incluir el elemento en cuestión, en el capítulo anterior se detalla cada elemento.

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