

---

---

---

# FIVE MINUTE GUIDE TO L<sup>A</sup>T<sub>E</sub>X

FIRST VERSION

TIM VAN DER HORST  
FRITS WENNEKER

\howto T<sub>E</sub>X<sub>{.com}</sub>

# Contents

<b>1</b>	<b>L<sup>A</sup>T<sub>E</sub>X Basics</b>	<b>1</b>
1.1	Document structure . . . . .	1
1.1.1	Preamble . . . . .	1
1.1.2	Environments . . . . .	1
1.1.3	Sectioning . . . . .	1
1.2	Text formatting . . . . .	1
1.3	Cross references . . . . .	1
<b>2</b>	<b>Typesetting content</b>	<b>2</b>
2.1	Equations . . . . .	2
2.1.1	Working with units . . . . .	2
2.2	Figures . . . . .	2
2.3	Tables . . . . .	3
2.4	Lists . . . . .	3
<b>3</b>	<b>Bibliography with BIB<sub>T</sub>E<sub>X</sub></b>	<b>4</b>
3.1	Using BIB <sub>T</sub> E <sub>X</sub> . . . . .	4
3.2	Adding bibliography items . . . . .	4

## Preface

The title of this document says it all: this is a [FIVE MINUTE GUIDE TO L<sup>A</sup>T<sub>E</sub>X](#), a way of typesetting documents that will save time and frustration. This guide is written to get you over the fairly steep learning curve. More L<sup>A</sup>T<sub>E</sub>X guides exist, but they all drown you in information. The content of this guide will teach you enough to write proper documents.

Before you can start, the L<sup>A</sup>T<sub>E</sub>X system needs to be installed. A guide for Windows and Mac OS X is found [here](#). To make life even easier, download [this](#) folder structure to start L<sup>A</sup>T<sub>E</sub>Xing right away.

May 27, 2012

# CHAPTER 1

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

Together with this guide comes a pre-made folder structure for managing L<sup>A</sup>T<sub>E</sub>X projects. The latest version is available [here](#). It's advised to open and play with it when following this guide.

### 1.1 Document structure

Three subfolders are present in the provided folder structure: *docs*, *figs* and *refs*. The *docs* folder contains the main content and the preamble. Section 1.1.1 explains the preamble, while the rest of this guide teaches about the main content of documents. The *figs* folder is the root where all figures are placed. Implementing figures in L<sup>A</sup>T<sub>E</sub>X is shown in section 2.2. The *refs* folder contains a file for the bibliography, explained in chapter 3.

*docs folder*

*figs folder*

*refs folder*

In order to compile your document, run the `master.tex` file in the root of the folder structure. In most LaTeX editors, the master file can be specified such that the document can also be compiled from the `.tex` files in the *docs* folder.

#### 1.1.1 Preamble

A L<sup>A</sup>T<sub>E</sub>X document is configured in the preamble. The `\documentclass[]{}`  command defines the *documentclass*, where `[]` contains optional arguments such as font size. The class is chosen between `{}`. Standard classes are `article`, `book`, `report`, `slides`, and `letter`.

*documentclass*

**Example 1** Creating a report with 10pt font size

```
\documentclass[10pt]{report}
```

□

The preamble also calls required *packages*: L<sup>A</sup>T<sub>E</sub>X tools. In the provided preamble all necessary packages are called, together with a brief explanation.

*package*

#### 1.1.2 Environments

Environments contain special content, such as math, figures, tables, etc. Environments start with `\begin{}` and end with `\end{}`, where the environment name is between `{}`. The `document` environment is most important: all content within this environment will be printed.

#### 1.1.3 Sectioning

A distinct part or subdivision of a writing is created with: `\section{}`, `\subsection{}`, `\subsubsection{}`, `\paragraph{}`, where `{}` contains the title. The `report` and `book` classes require an additional `\chapter{}` command.

### 1.2 Text formatting

Text is formatted with: `\textbf{}` for **bold**, `\textit{}` for *italic* and `\underline{}` for underlined text. As L<sup>A</sup>T<sub>E</sub>X uses certain characters for its own purposes, a few *special characters* should be remembered: `\&` for `&`, `\%` for `%`, `\$` for `$`, `\{ \}` for `{ }` and `\#` for `#`. A line break is created by either a double return or `\\`. A whole page is cleared with the `\clearpage` command.

*special characters*

### 1.3 Cross references

Cross referencing is one of the strong points of L<sup>A</sup>T<sub>E</sub>X and can be done to all items that contain a *counter*. A *label* is added to the item with `\label{}`, where the label name is between `{}`. For example, this section is labeled with `\label{sec:refs}` and can be referred to with `\cref{sec:refs}`, which is printed as: section 1.3. The `\cref{}` command is introduced by the `cleveref` package, which automatically determines the type of reference.

*label  
reference*

# CHAPTER 2

## Typesetting content

### 2.1 Equations

Equations and other mathematical expressions are created within *math* environments. There are two types of math environments: inline and display.

*Inline equations* are shown within the paragraph and are created by writing the equation between  $and  $.$$

*inline equation*

**Example 2** Creating an inline equation

The derivative of  $x^2$  is  $2x$                       The derivative of  $x^2$  is  $2x$                       □

*Display equations* are used for larger equations, as they are shown in distinct paragraphs. The `amsmath` package introduces the `align` environment for display equations.

*display equation*

**Example 3** Creating a display equation

```
\begin{align} \label{eq:example}
  y_{0} &= \frac{\sqrt{256}}{2} \\
  &= 2^3 = 8 \nonumber
\end{align}
```

$$y_0 = \frac{\sqrt{256}}{2} = 2^3 = 8 \quad (2.1)$$

*Subscripts* can be made with `_{}`  and *superscripts* with `^{}` . Use `&`  to vertically align the equations and add `\\`  to break a line. A *label* is added to the environment, such that a cross reference to equation (2.1) can be made with `\cref{eq:example}` . In order to suppress the automatic equation numbering, use the `align*`  environment or add `\nonumber`  to the desired line.

*sub- and superscript*

*suppress numbering*

#### 2.1.1 Working with units

The `siunitx` package provides an easy way to work with (SI) *units*. This is done with `\SI{}{}` , where the first `{}` contains the value and the second `{}` the unit. The `SI` command can be used both within and outside math environments.

*SI units*

**Example 4** Working with units

```
\SI{1}{\hertz} is equal to
\SI{2\pi}{\radian\per\second}
```

1 Hz is equal to  $2\pi \text{ rad s}^{-1}$                       □

### 2.2 Figures

Place figures in the provided *figs* folder. A figure is defined with a `figure` environment and its *placement* is determined by an optional argument between `[]`: `[h]` stands for *here*, `[b]` for *bottom*, `[t]` for *top* and `[p]` for *separate page*. To insert a figure, use `\includegraphics[]{}` , where `[]` contains the size and `{}` the filename. Center a figure with `\centering` . Also, a *label* and *caption* should be assigned.

*figs folder*  
*figure placement*

**Example 5** Inserting a figure named *logo.pdf*

```
\begin{figure}[h]
  \centering
  \includegraphics[width=30mm]{figs/logo}
  \caption{Caption example}
  \label{fig:logo}
\end{figure}
```



Figure 2.1: Caption example                      □

## 2.3 Tables

For nice looking tables, the `booktabs` package is recommended. A table is placed within a `table` environment: first a `caption` and `label` are defined, whereafter a `tabular` environment follows. In the latter, the content of the table can be placed. *Table rules* are created with `\toprule`, `\midrule` and `\bottomrule`.

*table rule*

**Example 6** Creating a table

```
\begin{table}[h]
  \centering
  \caption{Table caption}
  \label{tb:table}
  \begin{tabular}{crl}
    \toprule
    Name      & Grade & Year   \\
    \midrule
    John      & 7.5   & 2012  \\
    Richard   & 2     & 2010  \\
    \bottomrule
  \end{tabular}
\end{table}
```

Table 2.1: Table caption		
Name	Grade	Year
John	7.5	2012
Richard	2	2010

□

Similar to figures, *table placement* can be specified by `[h]`, `[t]`, `[b]` or `[p]`. The argument `{crl}` behind `\begin{tabular}` determines the *column alignment*: the first is centered with `c`, the second is right aligned with `r` and the last is left aligned with `l`.

*table placement*  
*column alignment*

## 2.4 Lists

In order to make lists, a listing environment must be created. The `enumerate` environment creates *numbered lists*.

*numbered list*

**Example 7** Creating a numbered list

```
\begin{enumerate}
  \item First entry
  \item Second entry
\end{enumerate}
```

1. First entry
2. Second entry

□

Similar, *bulleted lists* ( $\bullet$ ) are created with the `itemize` environment. It is possible to create nested lists by placing one listing environment into another. *Descriptive lists* are created using the `description` environment.

*bulleted list*  
*descriptive list*

**Example 8** Creating a descriptive list

```
\begin{description}
  \item[First] entry
  \item[Second] entry
\end{description}
```

- First** entry
- Second** entry

□

# CHAPTER 3

## Bibliography with BIBTEX

### 3.1 Using BIBTEX

BIBTEX provides a convenient way to create a consistent list of references. The provided *refs* folder contains a file `references.bib`, in which the *bibliography* items are listed. The bibliography style is determined by `\bibliographystyle{plain}`, where `plain` is the default style. The bibliography is printed by the command `\bibliography{refs/references}`. To *compile* or *update* the bibliography: run L<sup>A</sup>T<sub>E</sub>X, then BIBTEX and then L<sup>A</sup>T<sub>E</sub>X twice more.

*bibliography*

*compilation*

### 3.2 Adding bibliography items

Different entries exist for different sources, such as `@book`, `@article` and `@misc`. The following example creates a book reference with `@book`. In the same manner, the entries for `@article` and `@misc` (to cite websites) are created in the `references.bib` file.

**Example 9** Creating a book reference

```
@book{Last2012,  
  author   = {Last, First von},  
  title    = {Book},  
  publisher = {Publisher},  
  year     = {2012},  
}
```

[1] First von Last. *Book*. Publisher, 2012. □

In the first line, the reference name is assigned: `Last2012`. Use `\cite{Last2012}` to *cite* the reference in the L<sup>A</sup>T<sub>E</sub>X document, resulting in: [1].

*citation*

If no citation is made to the entry, it will not be added to the bibliography. Making BIBTEX entries can often be simplified with the help of internet: most article/book databases, such as Google Books and ScienceDirect, provide BIBTEX files.