# Introduction LaTeX

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**KU LEUVEN**

# Introduction

## About LATEX

- LATEXis not a word processor!
- It is a document typesetting program, with the aim of getting a beautiful result
- You edit source, view results in pdf (compare with html and real webpage)

## Why LATEX?

- Neat and professional look
- Easy for formulas
- No problems with numbering and references
- Platform independent
- Small files
- Multiple languages and fonts
- Stable: in Running and in Time
- Changes and collaboration: good editor or svn, subversion,...

# History

## History of TeX

- Donald E. Knuth (Stanford prof) was writing a book in 1977, and did not like the layout his publisher made, especially formulas
- He decided he could do better and started making TeX.
- In 1978 DEK took a sabbatical and finished TeX
- In 1982 and 1989, next version appeared, so we are now at version 3
- Each next version approaches $\pi$ a bit closer (Version 3.1415926-2.5-1.40.14 (TeX Live 2013/Debian))

## History of LaTeX

- LaTeX is a group of macro's written around TeX
- Developed by Leslie Lamport in the beginning of the eighties
- Currently we have version LaTeX2e, with LaTeX3 somewhere in the pipeline
- (there are multiple other TeX-derivates, such as ConTeXt, AMS-TeX, XeTeX, . . . )

# What you need

- Not WYSIWYG
    - Editor (http://www.tex.ac.uk/cgi-bin/texfaq2html?label=editors),
    - compiler (real LaTeX)
    - and viewer
- Before installation: visit the website of the software

## Linux

- Editor: Kile, emacs (+auctex), kate, gedit,. . .
- Alternative: Lyx is een WYSIWYM editor
- Distribution: TeXLive
- Viewer: acrobat reader, evince, okular, gv,. . .
- Installation: use your package manager (apt-get)

# What you need

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## Windows

- Editor:
  - Winedt (http://www.winedt.com)
  - TeXnicCenter (http://www.texniccenter.org)
  - LaTeX Editor (http://www.latexeditor.org/),...
- Lyx is a WYSIWYM editor
- Miktex (http://www.miktex.org) or TeXLive
- Yap for dvi (using miktex), gv (http://www.cs.wisc.edu/~ghost) and acrobat reader

# What you need

- Not WYSIWYG
  - Editor (http://www.tex.ac.uk/cgi-bin/texfaq2html?label=editors),
  - compiler (real LaTeX)
  - and viewer
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## Mac

- http://guides.macrumors.com/Installing_LaTeX_on_a_Mac

# What you need

- Not WYSIWYG
    - Editor (http://www.tex.ac.uk/cgi-bin/texfaq2html?label=editors),
    - compiler (real LaTeX)
    - and viewer
- Before installation: visit the website of the software

### Which Editor do I use?

- In principle, each editor is fine
- But a good editor has
    - font highlighting for LaTeX
    - spell check
    - debugging options
    - short-cuts for running latex and for often used commands,...

# What you need

- Not WYSIWYG
  - Editor (http: //www.tex.ac.uk/cgi-bin/texfaq2html?label=editors),
  - compiler (real LaTeX)
  - and viewer
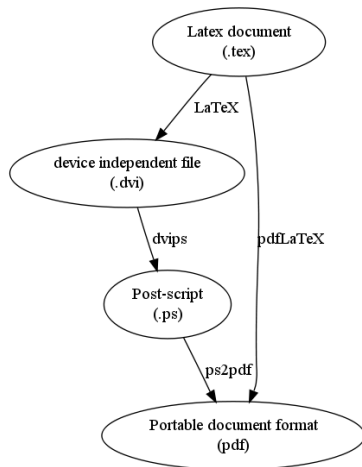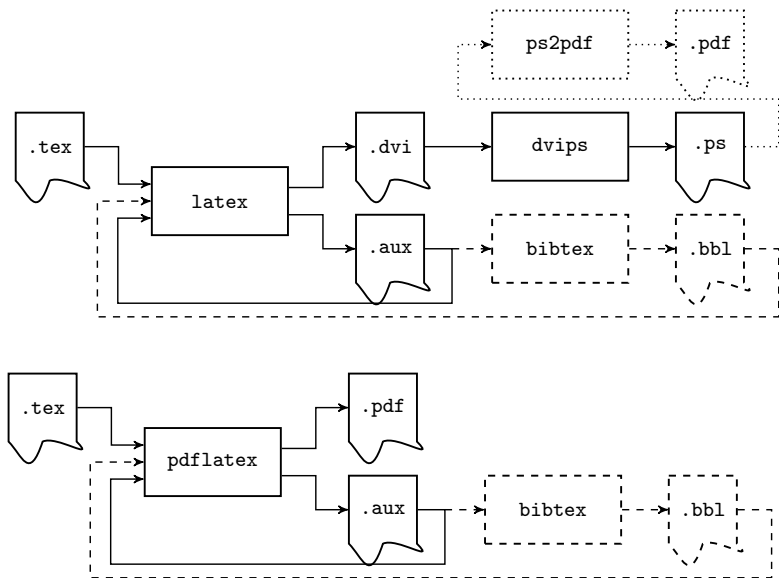- Before installation: visit the website of the software

# How does LaTeX work



Figure: LaTeX process

- pdf-LaTeXmethod is the easiest and recommended way
- Alternative (traditional) is LaTeX
  - Needed for some packages such as *pstricks*

# In detail with different file formats

# The LaTeX language

- Commands start with a backslash: \
  - e.g. `\LaTeX` gives LaTeX and `\footnote{the footnote}`, results in a footnote
- Comments start with the percent sign: %
  - "`lots of text, % little contents`" results in "lots of text,
- Arguments to a command that are obligated, are placed between curly brackets: { and }
  - "`3\textsuperscript{rd}`" results in 3$^{rd}$
- Options are placed between square brackets: [ and ]
  - example: `\section[short title]{long title}`
- LaTeX places the spaces, not you. This is between words and between paragraphs
- The commands `\begin{NAME}` and `\end{NAME}` indicate the beginning and end of the environment *NAME*.
- Note: After a latex command, no space is generated
  - "`\LaTeX is great`" results in "LaTeXis great"
  - "`\LaTeX{} and \TeX\ are great`" results in "LaTeX and TeX are great"

# Structure of a document

### 2 major parts

```
\documentclass[options]{document_class}
 % header
\begin{document}
 % body
\end{document}
```

# First line

\documentclass[options]{document_class} Document classes:

| | |
|---|---|
| article | for articles in scientific journals, presentations, short reports, program documentation, invitations,... |
| 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, theses, ... |
| book | for real books |
| beamer | for slides. The class uses big sans serif letters. |
| memoir | for changing sensibly the output of the document. It is based on the book class, but you can create any kind of document with it. |
| Koma script | similar to memoir but exists of a large set of independent document classes (scrbook, scrreport, scrartcl). |
| letter | for writing letters. |
| IEEEtran | for submitting to IEEE transactions. |

# First line

\documentclass[options]{document_class} Some common options:

| | |
|---|---|
| 10pt, 11pt, 12pt | Sets the size of the main font in the document. If no option is specified, 10pt is assumed. |
| a4paper, letter-paper,... | Defines the paper size. a5paper, b5paper, executivepaper, and legalpaper can be specified. |
| fleqn | Typesets displayed formulas left-aligned instead of centered. |
| leqno | Places the numbering of formulæon the left hand side instead of the right. |
| titlepage, noti-tlepage | The article class does not start a new page by default, while report and book do. |
| onecolumn, twocolumn | Instructs LaTeX to typeset the document in one column or two columns. |
| twoside, one-side | 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. |
| landscape | Changes the layout of the document to print in landscape mode. |
| openright, openany | Makes chapters begin either only on right hand pages or on the next page available. This does not work with the article class, as it does not know about chapters. The report class by default starts chapters on the next page available and the book class starts them on right hand pages. |
| draft | makes LaTeX indicate hyphenation and justification problems with a small square in the right-hand margin of the problem line so they can be located quickly by a human. |

# Header and body

## Header

- To define additional packages and options
  - \usepackage[swedish]{babel} loads the package babel (hyphenation support for non-English), with the option *swedish*
- For your own command definitions
- Make once, reuse afterwards
  - Good practice: load only what is needed to avoid problems and facilitate debugging (comment what you don't need)

## Body

- Your text and everything with it.
- Example: look at the thesis template

# Some basic packages in every LaTeX distribution.

| | |
|---:|:---|
| doc | Allows documenting LaTeX |
| exscale | For additional font sizes |
| fontenc | font encoding to be used (T1 or other) |
| inputenc | Allows different encodings for input texts: ASCII, ISO Latin-1, ISO Latin-2, 437/850 IBM code pages, Apple Macintosh, Next, ANSI-Windows. |
| ifthen | basic programming for LaTeX |
| latexsym | For the LaTeX-font for symbols |
| makeidx | To make an index |
| babel | For non-English texts. Note, it changes also other names (chapter will be Kapitel etc.). |
| graphicx | To include figures |
| tabularx | Tables with fixed width |
| hyperref | Links in your files |

Thousands of others ...

# Document structure

### Hierarchie

```
\part{part}
\chapter{chapter}
\section{section}
\subsection{subsection}
\subsubsection{subsubsection}
\paragraph{paragraph}
\subparagraph{subparagraph}
```

- Without enumeration: \section*{eerste sectie}
- Short and long title: \section[kort]{eerste sectie}
- Not all documentclasses have all levels!

# Document structure

## Title

- \title{}, \author{} and \date{} in header
- \maketitle in main file

## Appendix

- \appendix
- Everything after the command, is begin placed in the appendix
- Also the numbering of the chapters, sections, figures, tables,. . . will/can change (depending on your document class)

## Special signs

- These symbols cannot be used directly in a text:
- % $ & ~ _ ^ { }
- They have a special meaning, and need to be "escaped" using a backslash
- \% \$ \& \~ \_ \^ \{ \} gives % $ & _ ^ { }
- The backslash itself is \textbackslash: \, or as $\backslash$: \
- A dubble backslash \\ indicates a line end
- Gives also the possibility to include a vertical space: \\[8cm]
- Some symbols have a special code: \ldots, . . . , \texttrademark, ™
- All symbols: http://www.ctan.org/tex-archive/info/ symbols/comprehensive/symbols-a4.pdf

# Accents

- Traditionam: no accents (not commonly used in English and not within ASCII)
- solution: accent is a command on a character:
    - \'a, \`e, \"o en \^u
    - á, è, ö en û
- You can type accents directly, but you have to use input encoding (\usepackage[utf8]{inputenc}), normally together with font encoding (depending on the language, e.g. \usepackage[T1]{fontenc})
- Depending on the system, this can be default behavior
- Not supported in bibtex
- Conclusion:
    - Accents as command work always
    - It is easy to configure for yourself
    - Might give issues with compatibility

# References

## label and ref

- A \label can be placed immediately after (or in) a (sub-)(subsub-)section command
- In the caption of a figure or tabel
- With a formule
- With a theorema,...
- The \ref can be anywhere in the normal text
- Usefull names are important (exceptions can be formulas)
- No spaces
- Tell what kind of label it is
    - \label{fig:overzichtschema}: puts "fig:overzichtschema" with an object
    - \ref{tab:mendeljev}: refers to the label "tab:mendeljev"
    - \pageref{eq:12} refers to the page with the label "eq:12"
- A good editor helps you!

## Finally: do it yourself!

```
\documentclass[a4paper,11pt]{article}
\title{My first \LaTeX{} document}
\author{This is the place where you put your name}

\begin{document}
\maketitle
\section*{Introduction}
No number for the introduction\ldots
\section{First words in \LaTeX}
This text is just filling the space that is here,
you can put anything here

Let us now try some accents: \'a, \`e, \"o and \^u.
\subsection{A subtitle}
Enough for the first document
\end{document}
```

# Finally: do it yourself!

Make it a habit to put a label with every section, figure and table! (good editors help you)

```
\documentclass[a4paper,11pt]{article}
\title{My first \LaTeX{} document}
\author{This is the place where you put your name}

\begin{document}
\maketitle
\section*{Introduction}\label{sec:intro}
No number for the introduction\ldots
\section{First words in \LaTeX}\label{sec:first-word}
This text is just filling the space that is here,
you can put anything here

Let us now try some accents: \'a, \`e, \"o and \^u.
\subsection{A subtitle}\label{sec:subtitle}
Enough for the first document
\end{document}
```

# Debugging

## THE most annoying about LaTeX

- Error messages can be obscure (80-ties software)
- Where do you start?

## How to start looking for errors

1. Check the log (only look at the top/first error), maybe the error is clear. . .
2. You forgot brackets? Environment forgotten to close? Typo in command?. . .
3. Analyze the error message (L.210 means around line 210)
   - ! LaTeX Error: \begin{enumerate} on
     input line 9 ended by \end{itemize}.
4. Comment important pieces to isolate the fault
5. Move with your \end{document} until it compiles
6. Google!
7. Ask help on the net/friends/comp.text.tex/. . .
8. http://www.catb.org/~esr/faqs/smart-questions.html

# Environments

- Between \begin{NAME} and \end{NAME}
- Other rules apply in these regions (e.g. pagewidth, font,...)
- Examples:
  - quote
  - verse
  - verbatim
  - center
  - minipage
  - tabular
  - equation
  - itemize
  - figure

# Lists

```
\begin{itemize}
\item one
\item two
\end{itemize}
\begin{enumerate}
\item Firstly it is something
\item and secondly something else
\end{enumerate}
\begin{description}
\item[eerste label:] test test
\item[tweede label:] test failed
\end{description}
```

- They can be nested...

# Special lists

- \tableofcontents
- \listoffigures
- \listoftables
- Put them where you want them in your text (e.g. after your \maketitle)

# Big files

- Subdivide the text (in chapters?)
- \include{/path/to/file} in the body where you want it (and start on a new page)
- \includeonly{bestand1,bestand7} in the header to only compile some parts (faster on very old machines)
- \input{file} inserts the file directly, without starting on a new page

# Math mode

This is where LaTeX really becomes easy

## In normal text

- To use mathematics in a normal text, e.g. $\sqrt{\frac{\varepsilon}{2}}$, we use the math mode

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- `$\sqrt{\frac{\varepsilon}{2}}$`

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- `$\sqrt{\frac{\varepsilon}{2}}$`
- `\(\sqrt{\frac{\varepsilon}{2}}\)`

# Math mode

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## In normal text

- To use mathematics in a normal text, e.g. $\sqrt{\frac{\varepsilon}{2}}$, we use the math mode
- `$\sqrt{\frac{\varepsilon}{2}}$`
- `\(\sqrt{\frac{\varepsilon}{2}}\)`
- `\begin{math}\sqrt{\frac{\varepsilon}{2}}\end{math}`

# Math mode

This is where LaTeX really becomes easy

### In normal text

- To use mathematics in a normal text, e.g. $\sqrt{\frac{\varepsilon}{2}}$, we use the math mode
- `$\sqrt{\frac{\varepsilon}{2}}$` ⇐ use this one
- `\(\sqrt{\frac{\varepsilon}{2}}\)`
- `\begin{math}\sqrt{\frac{\varepsilon}{2}}\end{math}`

# Math mode: II

## Displaymath mode

$$\sqrt{\frac{\varepsilon}{2}}$$

- To use a formula not in an inline text (when important or too long), we use the displaymath mode:

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- 
    `\begin{equation*}\sqrt{\frac{\varepsilon}{2}}\end{equation*}`

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- 
  `\begin{displaymath}\sqrt{\frac{\varepsilon}{2}}\end{displaymath}`

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$$\sqrt{\frac{\varepsilon}{2}}$$

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- \begin{equation*}\sqrt{\frac{\varepsilon}{2}}\end{equation*}

- \begin{displaymath}\sqrt{\frac{\varepsilon}{2}}\end{displaymath}

- $$\sqrt{\frac{\varepsilon}{2}}\end{math}$$

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## Displaymath mode

$$\sqrt{\frac{\varepsilon}{2}}$$

- To use a formula not in an inline text (when important or too long), we use the displaymath mode:

- 
  `\begin{equation*}\sqrt{\frac{\varepsilon}{2}}\end{equation*}`
  ⇐ Use this one

- 
  `\begin{displaymath}\sqrt{\frac{\varepsilon}{2}}\end{displaymath}`

- `$$\sqrt{\frac{\varepsilon}{2}}\end{math}$$`

# Formulas with numbers

- Using numbered formulas: equation environment:
  \begin{equation}\sqrt{\frac{\varepsilon}{2}}\end{equation}

$$\sqrt{\frac{\varepsilon}{2}} \tag{1}$$

- Putting different equations nicely aligned underneath eachother: align environment (uit amsmath)
- Alignment is done on &, which you can see in the formulas 2 and 3
- Alternative is eqnarray (right & middle & left)

```
\begin{align}
q & = \sqrt{\frac{\varepsilon}{2}}\label{eq:3}\\
\frac{\pi^2}{6} & = \lim_{n \to \infty}\sum_{k=1}^n
\frac{1}{k^2}\label{eq:4}
\end{align}
```

$$q = \sqrt{\frac{\varepsilon}{2}} \tag{2}$$

$$\frac{\pi^2}{6} = \lim_{n\to\infty}\sum_{k=1}^n \frac{1}{k^2} \tag{3}$$

## Brackets in math mode

- round and square brackets without \ and curly brackets with \
- or use \left and \right
- or use $\big(\Big\{\bigg[\Bigg($: $\left(\left\{\left[\left(\right.\right.\right.\right.$

```
\begin{align}
(\sin(x)+y)&= \{[ z+\frac{a+b+\frac{4^k}{\pi}}{18+\int x}]\}
\label{eq:5}\\
\left(\sin(x)+y\right)&=\left\{\left[z+\frac{a+b+\frac{4^k}{\pi}}{18+\int x}
\right]\right\}\label{eq:6}
\end{align}
```

The result:

$$
(\sin(x) + y) = \{[z + \frac{a + b + \frac{4^k}{\pi}}{18 + \int x}]\} \tag{4}
$$

$$
(\sin(x) + y) = \left\{ \left[ z + \frac{a + b + \frac{4^k}{\pi}}{18 + \int x} \right] \right\} \tag{5}
$$

- A brace that is opened (with \left, must be closed. If needed with "\right."

# Matrices

### Use an array for matrices

```
\begin{equation}
\mathbf{X} =
\left[ \begin{array}{ccc}
x_{11} & x_{12} & \ldots \\
x_{21} & x_{22} & \ldots \\
\vdots & \vdots & \ddots
\end{array} \right]
\end{equation}
```

and the result:

$$\mathbf{X} = \left[ \begin{array}{ccc}
x_{11} & x_{12} & \ldots \\
x_{21} & x_{22} & \ldots \\
\vdots & \vdots & \ddots
\end{array} \right] \tag{6}$$

# Matrices

Alternative: amsmath package (\usepackageamsmath in header)

```
\begin{equation}
\mathbf{X} =
\begin{pmatrix}
x_{11} & x_{12} & \ldots \\
x_{21} & x_{22} & \ldots
\end{pmatrix}=
\begin{matrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{matrix}
=
\begin{bmatrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{bmatrix}
=
\begin{Bmatrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{Bmatrix}
\end{equation}
```

And the result:

$$\mathbf{X} = \begin{pmatrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{pmatrix} = \begin{matrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{matrix} = \begin{bmatrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{bmatrix} = \begin{Bmatrix} x_{11} & x_{12} & \ldots \\ x_{21} & x_{22} & \ldots \end{Bmatrix} \tag{7}$$

## Math symbols

- For an overview of the most common symbols: the not so short introduction to LaTeX
- Complete overview: `http://www.ctan.org/tex-archive/info/symbols/comprehensive/symbols-a4.pdf`
- Some important ones:
  `$\int, \sum, \pi, \Re, \Im, \mathbb{N}, \notin$`:
  $\int, \sum, \pi, \Re, \Im, \mathbb{N}, \notin$
- Some functions you should also typeset as a command:
  `$cos(\alpha) \cos(\alpha) sin(\alpha) \sin(\alpha)$`
  results in "$cos(\alpha)\cos(\alpha)sin(\alpha)\sin(\alpha)$"

# Tabular omgeving

- The tabular environment allows you to put information in a horizontally and vertically structured manner
- \begin{tabular}[opties]{specificaties}
- 1&2\\3&4\end{tabular}

```
\begin{tabular}{|r|l|}
\hline
7C0 & hexadecimaal \\
3700 & octaal \\
11111000000 & binair \\
\hline \hline
1984 & decimaal \\
\hline
\end{tabular}
```

| 7C0 | hexadecimaal |
|---:|:---|
| 3700 | octaal |
| 11111000000 | binair |

| 1984 | decimaal |
|---:|:---|

Inputting (large) tables is another annoyance of LATEX

## Tabulars: what you need to know

- Different (standard) column types are c, l, r, p{width}
- You can put a horizontal line as \hline, a partial one with \cline{2-4}
- Vertical lines: | next to the column type
- Merge columns:
  \multicolumn{aantal_kolommen}{opmaak}{inhoud}
- @{.} to align on the dot (column separator is the dot)

```
\begin{tabular}{c | r @{.} l}
Symbol & \multicolumn{2}{c|}{Value} \\
\hline
$\pi$ & 3&1416 \\
\cline{1-2}
$\pi^\pi$ & 36&46 \\
$(\pi^\pi)^\pi$ & 80662&7 \\
\end{tabular}
```

| Symbol | Value |
|--------|---------|
| $\pi$ | 3.1416 |
| $\pi^\pi$ | 36.46 |
| $(\pi^\pi)^\pi$ | 80662.7 |

# Nice tables

- Limit the lines in a table

no booktabs

```
\begin{tabular}{|l|r|}
\hline
header&nog\\
\hline
1&2\\
1&2\\
\hline
\end{tabular}
```

| header | nog |
|--------|-----|
| 1      | 2   |
| 1      | 2   |

## Nice tables

- Limit the lines in a table
- Use booktabs package for nicer tables

booktabs

```
\begin{tabular}{lr}
\toprule
header&nog\\
\midrule
1&2\\
1&2\\
\bottomrule
\end{tabular}
```

| header | nog |
|--------|-----|
| 1      | 2   |
| 1      | 2   |

## Nice tables

- Limit the lines in a table
- Use booktabs package for nicer tables
- Use the tabularx package to set the width of the table (X means column of the type "p" where the width is equal to the table width minus the other columns)

```
\begin{tabularx}{0.8\columnwidth}{lX}
\hline
header&nog\\
\hline
1&2\\
1&2\\
\hline
\end{tabularx}
```

| header | nog |
|--------|-----|
| 1 | 2 |
| 1 | 2 |

## Floating tables

```
\begin{table}[htbp]
  \centering
  \begin{tabular}{lr}
    \toprule
    header & nog\\
    \midrule
    1 & 2\\
    1 & 2\\
    \bottomrule
  \end{tabular}
  \caption{floating table\label{tab:table}}
\end{table}
```

| header | nog |
|--------|-----|
| 1      | 2   |
| 1      | 2   |

Table: floating table

- Moves through the text and is placed there where LaTeX thinks it is best
- You can refine this using the [*htbp*] options (here, top, bottom, page)
- You can refer to them, like here we do here to table 1 on page 50.
- Inside the table environment, you don't need a tabular environment

# How to make a table (efficiently)

- Data often comes from a spreadsheet
- Some programs allow you to export to LaTeX (e.g. gnumeric)
- Winedt has a table editor (others maybe also)
- Excel2latex ⇒ http://www.mackichan.com/index.html?
  techtalk/v30/30ts71.htm~mainFrame

## Insert an external figure

- In header: \usepackage{graphicx}
- Potentially in header: \graphicspath{{figs/}{fotos/}}
- In body:
  \includegraphics[option1,option2]{path/name/of/figure.ext}
- Using pdflatex you can include *.jpg*, *.png* and *.pdf*
- Using normal latex you can include *.eps* invoegen and *.png* and *.jpg* if you define a bounding box
- Vector images whenever possible!
- Some opties:

| | |
|---|---|
| width | Define the width of the figure (e.g.: width=0.8\textwidth) |
| height | Define the height of the figure (e.g.: height=6cm) |
| angle | Rotate the figure counter-clockwise (vb: angle=90) |
| scale | scale with factor |
| viewport=x1 y1 x2 y2 | look to the figure with a window at $(x_1, y_1)$ (lower left) $\rightarrow$ $(x_2, y_2)$ (upper right) |
| clip=true | clip to the viewport |

# Code for figures

`\includegraphics[width=0.4\textwidth]{latex.jpg}`



results in:

# Code for figures

```
\includegraphics[width=0.4\textwidth]{cute-chick.jpg}
\includegraphics[width=0.4\textwidth,
viewport=50 50 150 200,clip=true]{cute-chick.jpg}
```
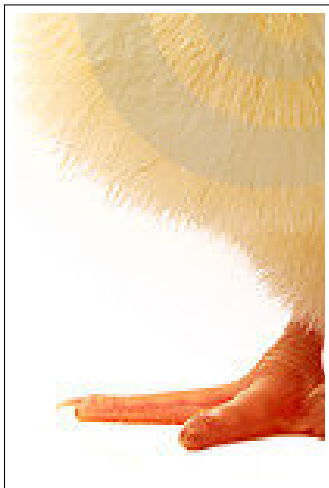
Geeft:

# Code for figures

```
\includegraphics[width=0.4\textwidth]{cute-chick.jpg}
\includegraphics[width=0.4\textwidth,
viewport=50 50 150 200,clip=true]{cute-chick.jpg}
```



Geeft:

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```
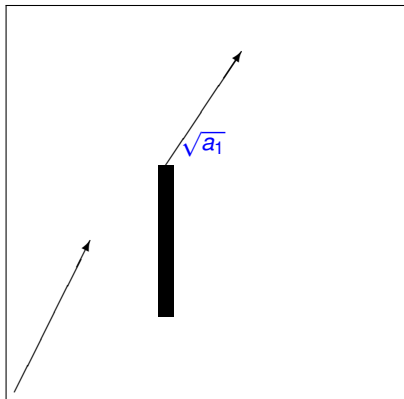


Geeft:

# Making figures in LaTeX

- Picture environment
- pstricks
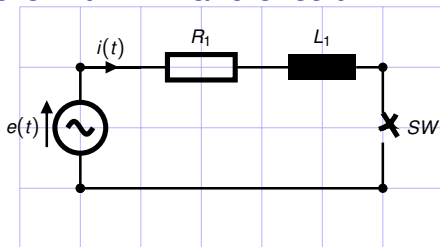- Tikz (http://en.wikipedia.org/wiki/PGF/TikZ)

```
\fbox{\setlength{\unitlength}{1cm}
\begin{picture}(5,5)
  \linethickness{6pt}
  \put(2,1){\line(0,1){2}}
  \put(0,0){\vector(1,2){1}}
  \put(2,3){\vector(2,3){1}}
  \color{blue}
  \put(-2,6){\circle*{10}}
  \put(2.2,3.2){$\sqrt{a_1}$}
\end{picture}}
```

# Figure with Tikz and circuitikz



```
\begin{circuitikz}[>=stealth']
 \draw[blue!30,step=10mm] (-1,-1) grid (6,3);
 \draw[very thick] (0,0)
    to[sV=$e(t)$,*-*] (0,2)
    to[short,i=$i(t)$] (1,2)
    to[R=$R_1$] (3,2)
    to[L=$L_1$,-*] (5,2)
    to[closing switch=$SW$] (5,0)
    to[short,*-*] (0,0);
\end{circuitikz}
```

# Floating figure environment

- Similar as table
- Also here important to remember labels and references



```
\begin{figure}[btp]
\includegraphics[width=0.5\columnwidth]{latex}
\caption{bijschrift\label{fig:figuur}}
\end{figure}
```

Figure: bijschrift

http://www.ctan.org/tex-archive/info/epslatex.pdf

# Bibtex

- In a separate .bib bestand ⇒ sort of database in ASCII format
- Number of fields are required (depending on type) some are optional
- Always needed: unique `key`
- http://en.wikipedia.org/wiki/BibTeX
- Use the abilities of your editor
- To refer to a reference: \cite{key}
- \bibliographystyle{IEEEtran}
- \bibliography{file1,file2}
- latex file.tex; bibtex file; latex file.tex; latex file.tex
- pdflatex file.tex; bibtex file; pdflatex file.tex; pdflatex file.tex
- \nocite{key} and \nocite{*}

# Bibtex II

- Giving names:
    - last-name1a last-name1b, first-name1a first-name1b **and** last-name2a last-name2b, first-name2a first-name2b
    - author={Kwak, Alfred Jodocus and of Belgium, Albert Felix Humbert Theodoor Christiaan Eugène Marie}
- Capitals: Yet another LaTeX "feature"!
    - Most (all?) bibtex formats remove all capitals except for the first one from titles
    - ⇒ put the capitals you would like to retain between curly brackets
    - title={Belgium, capital of {E}urope and {NATO}, but no government}
    - or use \mbox
- IEEExplore, Elsevier, google scholar let you download complete bibtex references. Search for it!

## Examples

```
@Book{kundur93:_power_system_stabil_contr,
  author =   {Kundur, Prabha},
  title =    {Power System Stability and Control},
  publisher =    {McGraw-Hill},
  year =    1993,
  number = {ISBN: 0-07-035958-X},
  series = {EPRI: Power Systems Engineering},
  address =   {New York}
}
@article{AE2005,
    author = {Einstein, Albert},
    title = {Zur Elektrodynamik bewegter K\"orper},
    journal = {Annalen der Physik},
    year = 1905,
    volume = 17,
    month = jun,
}
```

# LATEX at KU Leuven engineering

### There is a template

- `https://eng.kuleuven.be/onderwijs/studenten/masterproef/index.html`, `ftp://ftp.esat.kuleuven.be/latex/kulemt/`
- Read the manual!
- Extensive template, many options (e.g. choose the correct master)
- Focus is contents!. . .
- Chapters in separate files?
- Save your figures and the source in a meaningfull and clear spot
- Start on time. . .

## Nice to know stuff

- Xfig: figures (line diagrams) in which you can export LaTeX
- Several other scientific packages allow you to do this (somehow)
- Easy way to get figures from xls or elsewhere: print to pdf
- Matlab figures: laprint:
  `http://www.mathworks.com/matlabcentral/fileexchange/loadFile.do?objectId=4638&objectType=file`
- IEEE citations: directly from the IEEEXplore website (similar for elsevier)
- Jabref, mendeley: more advanced manager for bibtex files (or even collections of papers)

# Links

- Not so short introduction to LATEX:
  http://tobi.oetiker.ch/lshort/lshort.pdf
- LATEX wiki: http://en.wikibooks.org/wiki/LaTeX
- The FAQ: http://www.tex.ac.uk/cgi-bin/texfaq2html
- http://homes.esat.kuleuven.be/~dvherten/latex.html
- http://www.google.be
- http:
  //homes.esat.kuleuven.be/~dvherten/esatthesis.html
- http:
  //homes.esat.kuleuven.be/~dvherten/latex_cursus.zip
- https://eng.kuleuven.be/onderwijs/studenten/
  masterproef/index.html,
  ftp://ftp.esat.kuleuven.be/latex/kulemt/

# Vragen?

*?*

●

**INTRODUCTION LATEX**
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**KU LEUVEN**