Introduction to LaTeX Part II
for MST–Students

Sascha Frank

IFI

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Outline

- Basic
- Scientific Writing
- Usepackages, Presentation etc.

footnotes

Input

Some seensless\footnote{In our view} Text.

Output

Some seensless[a] Text.

_____

[a]In our view

Tables

The default tabular enviroment don't support footnotes!

references within text

Input

Mark a text by a keyword `\label{keyword}`.
Reference with `\ref{keyword}`.

Output

Mark a text by a keyword .
Reference with 1. Here slide number.

page reference

Or the pagenumber with `\pageref{keyword}`.
Or the pagenumber with 5.

twice

run LaTeX $2\times$

counters – What is counted?

- lists
    - chapter, section, figure, table ...
- page
- equation
- footnote
- enumerations

commands about counting

- \newcounter{name}
- \setcounter{name}{new value}
- forms of numbers
    - \roman{name}
    - \arabic{name}
    - \alph{name}
    - \Alph{name}
    - \fnsymbol{name}
- \addtocounter{name}{value}
- \stepcounter{name}
- \value{name}

abstract and appendix

abstract

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

appendix

```
\appendix
\section{Figures}
\section{Tables}
```

appendix

Appendix use capital letters for counting.

structure

- no plain text
- use \input{name} to include single TeX files
- example

  ```
  \begin{document}
  \input{chapter1}
  \input{chapter2}
  \end{document}
  ```

alternative

\include{file} but better use input

lists of . . .

- table of contens \tableofcontents
- list of figures \listoffigures
- list of tables \listoftables
- list of references

structure

headings

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

table of contents

```
\tableofcontents
```
headings were automatically included

implementation

```
\headingcommand{Heading}
\headingcommand[short form]{Heading}
\headingcommand*{Heading}
```

figure

package
graphicx

format
eps, pdf, jpg

command
\includegraphics(Options: draft, scale, angle)

example
\includegraphics[scale=0.5, angle=90]{logo}

lists of figures

```
\begin{figure}
\includegraphics[scale=0.1]{logo-SF}
\caption{what ever}
\end{figure}
```

file type pdflatex

jpg, pdf, png . . .

lists of tables

```
\begin{table}
\begin{tabular}{|c|c|c|}
\hline
A & B & C\\
1 & 2 & 3\\
\hline
\end{tabular}
\caption{simple example}
\end{table}
```

A	B	C
1	2	3

Table: simple example

BiB - TeX overview

- name literatur.bib
- quote with \cite{kurz2}
- sources
- include

example entry

```
@TechReport{RePEc:pra:mprapa:5765,
author={Frank, Sascha and Rehm, Jan},
title={An unnoted fair bet in german state run lotteries,
a short notice},
year=2007,
month=Nov,
institution={University Library of Munich, Germany},
type={MPRA Paper},
url={http://ideas.repec.org/p/pra/mprapa/5765.html},
number={5765},
abstract={},
keywords={}
}
```

place and style

place \bibliography{literatur}
style \bibliographystyle{unsrtdin}

must and can

Different source have different can and must fields

must and can fields:

Book (author,editor,title, publisher, year, series, edition, . . .)

Article (author, title, journal,year, key, volume,. . .)

PhdThesis (author, title, school, year, address, month, note, . . .)

TechReport(author, title, journal, year, key, type,. . .)

problems

for example ä etc. or & will cause some problems

how to run

1. pdflatex seminar.tex
2. pdflatex seminar.tex
3. bibtex seminar
4. pdflatex seminar.tex
5. pdflatex seminar.tex
6. acroread seminar.pdf

text

example

```
If $a,b \in R,
then (a+b)^{2} = a^{2} + 2ab + b^{2} $\\
```

Output

If $a, b \in R, then(a + b)^2 = a^2 + 2ab + b^2$

better

example

```
If $a,b \in R,
\textrm{then}\, (a+b)^{2} = a^{2} + 2ab + b^{2}$\\
```

Output

If $a, b \in R, \text{then} (a + b)^2 = a^2 + 2ab + b^2$

text amsmath

example

```
If $a,b \in R,
then (a+b)^{2} = a^{2} + 2ab + b^{2} $\\
```

Output

If $a, b \in R, then(a + b)^2 = a^2 + 2ab + b^2$

better

example

```
If $a,b \in R,
\text{then}\, (a+b)^{2} = a^{2} + 2ab + b^{2}$\\
```

Output

If $a, b \in R, \text{then}\, (a + b)^2 = a^2 + 2ab + b^2$

distance & brackets

distance

$x y$ xy
$x\,y$ $x\,y$
$x\quad y$ $x \quad y$

brackets

instead (x + \sum_{i=0}^{n} y^{i^{2}}}) $(x + \sum_{i=0}^{n} y^{i^2})$
better
\left(x + \sum_{i=0}^{n} y^{i^{2}} \right) $\left(x + \sum_{i=0}^{n} y^{i^2}\right)$

normal stuff

exponents and indices

`$e^{i \phi}$` $e^{i\phi}$
`$a_{i}$` a_i

root

`$\sqrt{2}$` $\sqrt{2}$
`$\sqrt[3]{2}$` $\sqrt[3]{2}$

frac

`$\frac{1}{a}$` $\frac{1}{a}$
`$\frac{1}{\frac{a}{b}}$` $\frac{1}{\frac{a}{b}}$

normal stuff 2

SPI

`$\sum_{i=1}^{n} a_{i}$` $\sum_{i=1}^{n} a_i$
`$\prod_{i=1}^{n} a_{i}$` $\prod_{i=1}^{n} a_i$
`$\int x \ dx $` $\int x\, dx$

SPI

`$\sum\limits_{i=1}^{n} a_{i}$` $\sum\limits_{i=1}^{n} a_i$

`$\prod\limits_{i=1}^{n} a_{i}$` $\prod\limits_{i=1}^{n} a_i$

`$\int\limits_{-\infty }^{\infty} x \ dx$` $\int\limits_{-\infty}^{\infty} x\, dx$

remarks & braces

remarks

```
\dots    ...
\vdots    ⋮
\ddots    ⋱
```

under...

```
$\underbrace{a+\dots+a}_{\textrm{n-times}} = na $
```

$$\underbrace{a + \cdots + a}_{\text{n-times}} = na$$

over...

```
$\overbrace{a+\dots+a}^{\textrm{n-times}} = na $
```

$$\overbrace{a + \cdots + a}^{\text{n-times}} = na$$

in line

$ Input

```
$ x-y \leq 0 \, \forall \, x \leq y $
$ \sum_{i=0}^{n} a_{i}$
```

$ Output

$x - y \leq 0 \, \forall \, x \leq y \, \sum_{i=0}^{n} a_i$

displaymath

Input

```
\begin{displaymath}
 x-y \leq 0 \, \forall \, x \leq y
\sum_{i=0}^{n} a_{i}
\end{displaymath}
```

Output

$$x - y \leq 0 \, \forall \, x \leq y \sum_{i=0}^{n} a_i$$

Input displaymath–short

```
\[ x-y \leq 0 \, \forall \, x \leq y \]
```

Output displaymath–short

$$x - y \leq 0 \, \forall \, x \leq y$$

equation

Input

```
\begin{equation}
 x-y \leq 0 \, \forall \, x \leq y
\end{equation}
\begin{equation}
\sum_{i=0}^{n} a_{i}
\end{equation}
```

Output

$$x - y \leq 0 \, \forall \, x \leq y \tag{1}$$

$$\sum_{i=0}^{n} a_i \tag{2}$$

eqnarray

Input eqnarray

```
\begin{eqnarray}
 x-y & \leq & 0 \, \forall \, x \leq y \\
\sum_{i=0}^{n}a_{i}&\geq&0\, \forall \,a_{i}\geq0
\end{eqnarray}
```

Output eqnarray

$$x - y \ \leq \ 0 \, \forall \, x \leq y \tag{1}$$

$$\sum_{i=0}^{n} a_i \ \geq \ 0 \, \forall \, a_i \geq 0 \tag{2}$$

```
\begin{eqnarray}
\sin^{'} &=& \cos(x) \\
\cos^{'} &=& - \sin(x) \\
\sin^{''} &=& - \sin(x) \\
\sin^{'''} &=& - \cos(x) \\
\sin^{''''} &=& \sin(x) \\
\end{eqnarray}
```

$$\sin^{'} = \cos(x) \qquad (1)$$
$$\cos^{'} = -\sin(x) \qquad (2)$$
$$\sin^{''} = -\sin(x) \qquad (3)$$
$$\sin^{'''} = -\cos(x) \qquad (4)$$
$$\sin^{''''} = \sin(x) \qquad (5)$$
$$(6)$$

```
\begin{eqnarray}
\sin^{'} &=& \cos(x) \\
\cos^{'} &=& - \sin(x) \\
\sin^{''} &=& - \sin(x) \\
\sin^{'''} &=& - \cos(x) \\
\sin^{''''} &=& \sin(x)
\end{eqnarray}
```

$$\sin^{'} = \cos(x) \qquad (1)$$
$$\cos^{'} = -\sin(x) \qquad (2)$$
$$\sin^{''} = -\sin(x) \qquad (3)$$
$$\sin^{'''} = -\cos(x) \qquad (4)$$
$$\sin^{''''} = \sin(x) \qquad (5)$$

eqnarray 2 better 2

```
\begin{eqnarray}
\sin^{'} &=& \cos(x) \\
\cos^{'} &=& - \sin(x) \nonumber \\
\sin^{''} &=& - \sin(x) \\
\sin^{'''} &=& - \cos(x)
\end{eqnarray}
```

$$
\begin{array}{rcl}
\sin^{'} & = & \cos(x) \quad\quad (1) \\
\cos^{'} & = & -\sin(x) \\
\sin^{''} & = & -\sin(x) \quad\quad (2) \\
\sin^{'''} & = & -\cos(x) \quad\quad (3)
\end{array}
$$

without numbers

example

```
\begin{eqnarray*}
\sin^{'} &=& \cos(x) \\
\cos^{'} &=& - \sin(x) \\
\end{eqnarray*}
```

$$\sin^{'} = \cos(x)$$
$$\cos^{'} = -\sin(x)$$