Introduction to LaTeX

Christoph Pickl

Who **knows** (La-)TeX?

Who has ever **written** a document with it?

Who has ever written a **package**?

Agenda

1. Basics – First steps with LaTeX

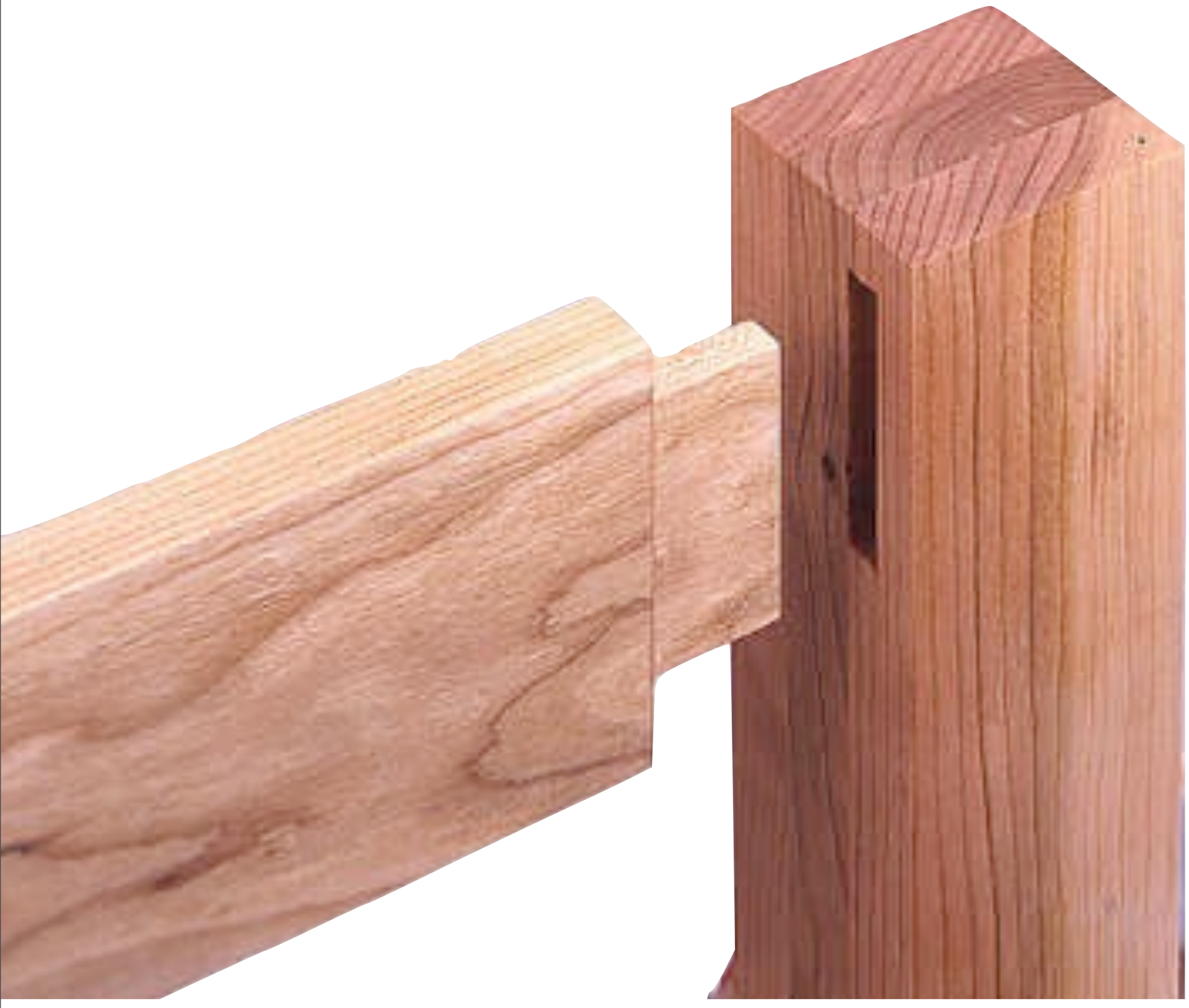
- Creating a LaTeX-Document with commands and environments

2. Intermediate – Becoming a TeXpert

- Structuring text, font styles, images, tables

3. Advanced – Becoming a real Guru

- Math, references, custom commands and environments



Basics

First steps with LaTeX

Ingredients

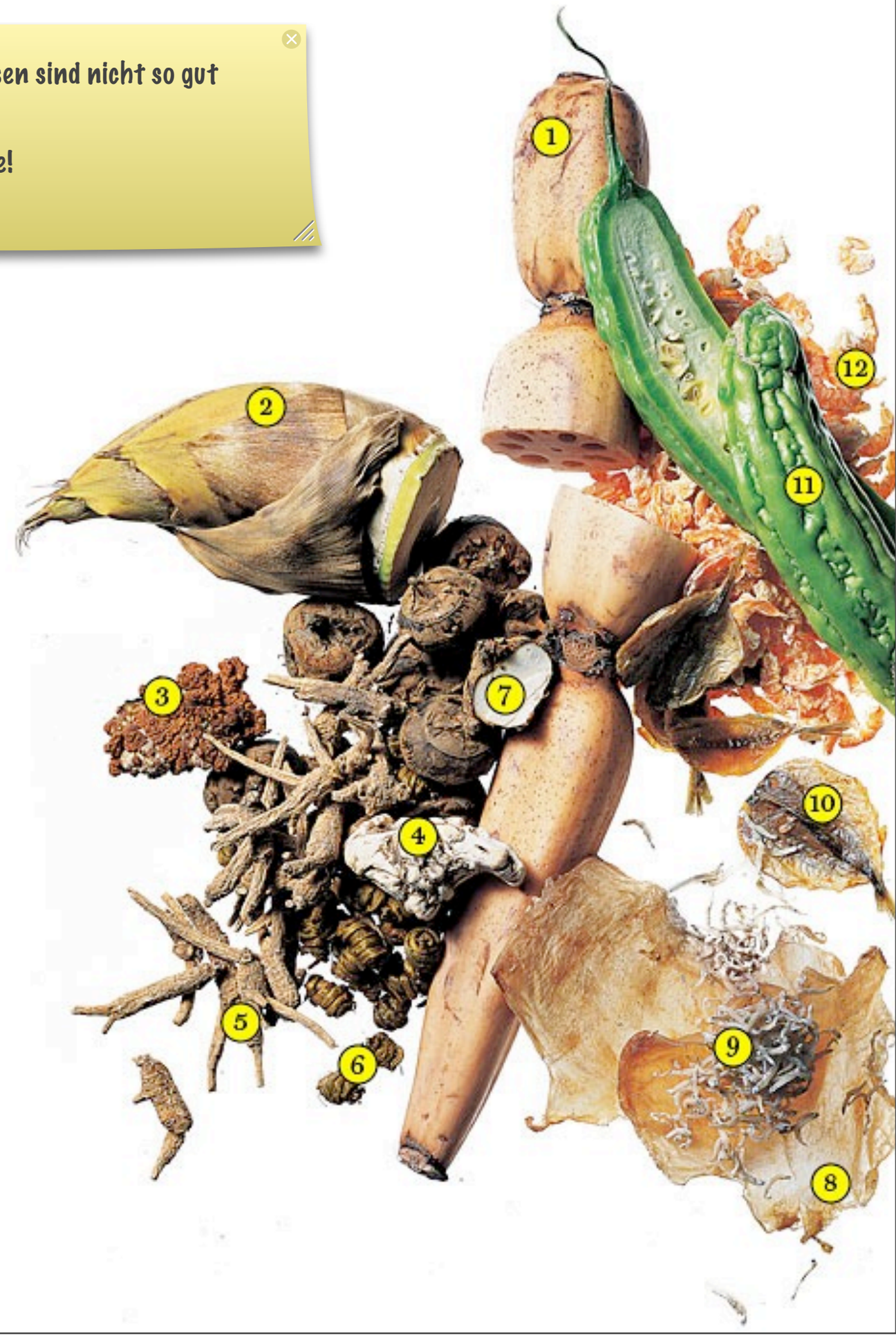
standard dokumentenklassen sind nicht so gut
(USA spezifisch, unflexibel)

KOMA-skript bietet abhilfe!
Oder besser: memoir klasse

- **Documentclass**
  - `book`, `article`, ...
- **Packages**
- **Commands**

  \foobar[*optarg*]{*reqarg*}
- **Environments**

  \begin{*foo*} ... \end{*foo*}



All you need is ...

```
\documentclass[myoptions]{mydocumentclass}

\usepackage[latin1]{inputenc}
\usepackage[ngerman]{babel}
\usepackage{mypackage}

% layout definitions
% etc ...

\begin{document}
  % actual content of the document
\end{document}
```

Document Content

- Linefeeds will seperate paragraphs from each other:

```
My first paragraph. ↵
Sentence two will be on same line. ↵
↵
My second paragraph. ↵
\\ % enforce linebreak, or use \newline command ↵
My third paragraph.
```

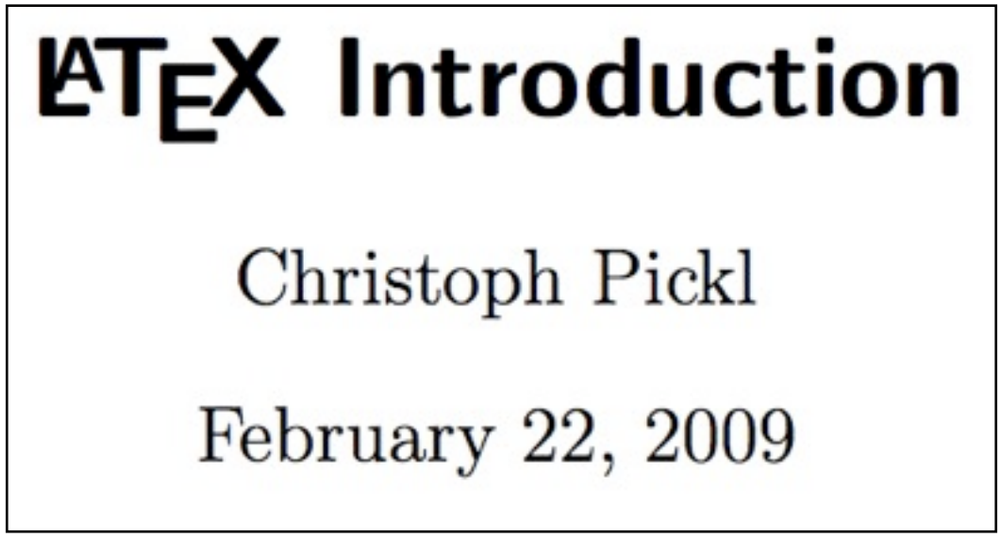
Titlepage

- First of all define some metadata ...

```
\title{{\LaTeX} Introduction}
\author{Christoph Pickl}
\date{\today}
```

- ... then invoke proper command:

```
\begin{document}
  \maketitle
  \newpage
  % ...
\end{document}
```



Intermediate

Becoming a TeXpert

Ingredients

- Structuring Text
- Font Styles
- Lists
- Images
- Tables

Structuring Text

```
\documentclass[a4paper]{scrartcl}
\usepackage[latin1]{inputenc}
\usepackage[ngerman]{babel}
\title{{\LaTeX} Introduction}
\author{Christoph Pickl}
\date{\today}
\begin{document}
 % \maketitle
 % \newpage
\include{01_mychapter}
\end{document}
```

\input{} erzeugt keinen seitenumbruch

Structuring Text ctd.

- Make use of `section`, `subsection`, `subsubsection`, `paragraph`, ...

```
\section{Introduction}
\subsection{All you need is \ldots}
\subsection{Titlepage}

\section{Intermediate}
\subsection{Structuring Text}
\subsubsection{Table of Contents}
```

- Automatically print contents with **\tableofcontents**

Font Styles

Command	Output
\textbf{Foobar}	**Foobar**
\textit{Foobar}	*Foobar*
\texttt{Foobar}	`Foobar`
\tiny{x}, \scriptsize{x} \small{x}, \large{x}, \Large{x}, \LARGE{x} \huge{x}, \Huge{x}	x x x x x x x x

Lists

- Define an **unordered** list (using a default circle as bullet icon):

```
\begin{itemize}
  \item My first item
\end{itemize}
```

- Define an **ordered** list (using default arabic digits with a trailing dot):

```
\begin{enumerate}
  \item My first item
  \item My second item
\end{enumerate}
```

Images

- First have to include a **required package**:

```
\usepackage{graphicx}
```

- Then put the image via `includegraphics` in a `figure` environment:

```
\begin{figure}[!h] % enforce position here (top, page, bottom)
  \centering
  \includegraphics{Christoph_Pickl_himself.png}
  \caption{Picture of Christoph Pickl}
  \label{IMG:christoph_pickl}
\end{figure}
```

Tables

- Tables are actually only **tabulators with borders**:

```
\begin{table}[htpb]
  \begin{center}
    \begin{tabular}{llclc} % alignment via: left, center, right
      & \textbf{Heading 1}& \textbf{Heading 2} \\ \hline \hline
      Row 1  &  Cell 1/1  &  Cell 2/1 \\ \hline
      Row 2  &  Cell 1/2  &  Cell 2/2 \\
    \end{tabular}
  \end{center}
  \caption{This is my first table} \label{TBL:first_table}
\end{table}
```

Advanced

Becoming a real Guru

Ingredients

- Math Formulas
- Citations
- References
- Own Commands & Environments

Mathematical Formulas

- Put all of your math stuff in dollar signs:

The variable x contains the value of y.

The variable x contains the value of y.

- Typeset some more complicate formulas:

```
\neg (A \rightarrow B ) \hspace{0.4cm}\Rightarrow
\hspace{0.4cm} \neg ( \neg A \vee B ) \hspace{0.4cm}
\Rightarrow \hspace{0.4cm} \neg \neg A \wedge \neg B
\hspace{0.4cm}\Rightarrow \hspace{0.4cm} A \wedge \neg B
```

$$\neg(A \rightarrow B) \quad \Rightarrow \quad \neg(\neg A \vee B) \quad \Rightarrow \quad \neg\neg A \wedge \neg B \quad \Rightarrow \quad A \wedge \neg B$$

Citations

- First have to define bibliography *database*:

```
\begin{thebibliography}{99}
  \bibitem[PiPr09]{BIB:pickl_preining_book}
    Christoph Pickl and Norbert Preining:
    \textit{Some non-existing book}. O'Reilly Inc., {\bf 2009}
\end{thebibliography}
```

- Anywhere in the text reference the book via the `cite` command:

```
As mentioned in~\cite{BIB:pickl_preining_book}.
```

- For a more sophisticating approach have a look at **bibtex**

References

- Put labels on images, tables, sections, ...

```
\begin{figure}
    \includegraphics{Christoph_Pickl_himself.png}
    \caption{Picture of Christoph Pickl}
    \label{IMG:christoph_pickl}
\end{figure}
```

- Then reference the section itself or the page it occurs:

```
As you can see in Figure~\ref{IMG:christoph_pickl} on page~
\pageref{IMG:christoph_pickl}.
```

Label auch auf section draufgeben

Custom Commands & Environments

- For example, create a shortcut to include graphics:

```
\newcommand{\mycmd}[1]{
  \begin{figure}\centering\includegraphics{#1}\end{figure}
}
\mycmd{Christoph_Pickl_himself.png}
```

- Or a shortcut to produce a centered math environment:

```
\newenvironment{myenv}[1]
  { \textbf{#1} says: \begin{center}\begin{math} }
  { \end{math}\end{center}  }
\begin{myenv} x \Rightarrow y \end{myenv}
```

http://en.wikibooks.org/wiki/LaTeX/Customizing_LaTeX

Summary

- **Commands** and **environments** form the basic concepts
- More functionality is provided via **packages**
- All **common elements** are supported out-of-the-box:
  - Lists, tables, images, automatic indices, references, footnotes, ...
- Have to know many commands, but very powerful underneath

Links

- **http://tobi.oetiker.ch/lshort/lshort.pdf**
- http://web.student.tuwien.ac.at/~e0525580/rsrc/Christoph_Pickl-Latex_Schnelleinstieg.pdf
- http://www.dante.de/faq/de-tex-faq/html/de-tex-faq.html
- http://www.haptonstahl.org/latex/index.php
- http://www.artofproblemsolving.com/LaTeX/AoPS_L_GuideLay.php