

Presentation in Beamer

Introduction to presentation in LaTeX

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July 23, 2013 in Nové Hrady

Outline

- 1 What is LaTeX and Beamer?
- 2 Motivation
- 3 What you need?
- 4 Philosophy
- 5 Code examples
- 6 Conclusion
- 7 Reference

What is LaTeX and Beamer?

What is LaTeX?

LaTeX

LaTeX is a **document markup language** and document preparation system for the **TeX** (typesetting program) - it creates final *pdf document*.

Uses ***.tex** file - created using some form of text editor or WYSIWYG.

Name origin

From capital Greek letters tau, epsilon, and chi, as the name of TeX derives from the Greek - means skill, art, technique)

Pronounced

/'la : tɛx/, /'l : tɛk/or /'leɪtɛk/.

[en.wikipedia.org/wiki/LaTeX]]



Figure 1 : Latex.

[socaltrailriders.org]

LA_TE_X

Figure 2 : LaTeX logo.

What is Beamer?



Figure 3 : A beam.

[cdni.wired.co.uk]

Beamer

- ✗ a English boy name. The meaning of the name is 'trumpeter' Beamer, Bemeere.
- ✗ American slang for a BMW car.
- ✓ LaTeX class for creating slides for presentations.

Translation to czech

Beamer = *rychlý nadhoz, válové snovadlo* (?!).

Motivation

Why use Beamer and LaTeX?

Why use Beamer and LaTeX?

- **presentation under control**

- not as PowerPoint,
that do what he want
(typically positioning)

- **easy changeable**

- one line change look
of the whole
presentation

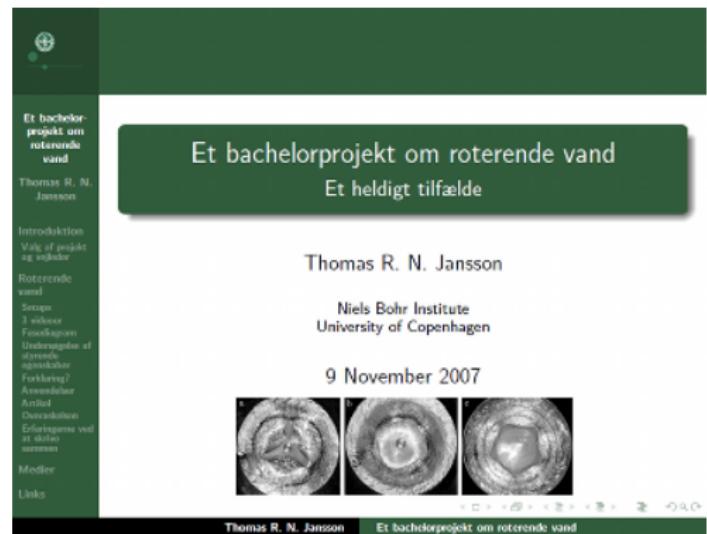


Figure 4 : Example of Beamer presentation.
[tjansson.dk/]

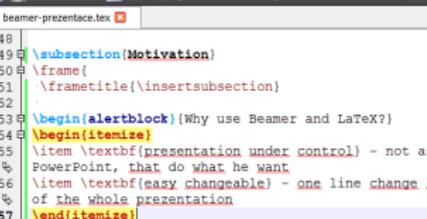
Advantages



Figure 5 : Beamer!
[chennaisocialmedia.com]

- **uniform** - format and positioning according to typographic rules
- **vector images** - able to insert
- **images** - easy to change image by changing source file
- **resizing image** - no problem
- **math, code, special chars** - easy to write math expression
- **source code** - highlighting source codes
- **outlines, navigation, reference, citation** - created automatically
- **professional looking, macros, templates...**

For effective work it is good to know some commands.
Sometimes is a problem to find where error is.
Compiling, compiling, compiling...



The screenshot shows the TeXShop application window. The menu bar includes 'Soubor', 'Úpravy', 'Identifikátor', 'Nástroje', 'LaTeX', 'Matematika', 'Průvodci', 'Bibliografie', 'Makra', 'Pohled', and 'Volby'. The main area displays the LaTeX code for a Beamer presentation. The code includes sections like \subsection{Motivation}, \begin{frame}{\insertsubsection}, \begin{itemize}, and \begin{block}{Another advantages}. The code also contains several \item commands with various text blocks and mathematical symbols. A status bar at the bottom shows 'Rádce: 257 Výhledových sloupců; 13 Textových sloupců; 13 Režim: Vložit'.

```
beamer-prézentace.tex
248
249 \subsection{Motivation}
250 \begin{frame}{\insertsubsection}
251 \begin{itemize}
252 \item \begin{alertblock}{Why use Beamer and LaTeX?}
253 \begin{itemize}
254 \begin{itemize}
255 \item \textbf{presentation under control} - not as
256 PowerPoint, that do what he want
257 \item \textbf{easy changeable} - one line change look
258 of the whole presentation
259 \end{itemize}
260 \end{itemize}
261 \end{alertblock}
262 \begin{columns}
263 \column{7cm}
264 \begin{block}{Another advantages}
265 \begin{itemize}
266 \item \textbf{uniform} - format according to
267 typographic rules
268 \item \textbf{math, code, special chars} - easy to
269 
```

The screenshot shows the TeXShop application window. The main area displays a LaTeX file named `beamer-prezentace.tex`. Several error messages are visible in the code editor:

- Rádek 47: `\begin{frame}` undefined control sequence. Víceřad.
- Rádek 48: `\begin{document}` undefined control sequence. Víceřad.
- Rádek 49: `\begin{frame}` Missing \begin{document}. Víceřad.
- Rádek 50: `\begin{frame}` Environment listing undefined. Environment (listing).
- Rádek 51: `\begin{frame}` Can be used only in preamble. \usepackage undefined.
- Rádek 52: `\begin{frame}` Undefined control sequence. Víceřad.
- Rádek 53: `\begin{frame}` Environment listing undefined. Environment (listing).

The status bar at the bottom indicates "Rádek: 47 Vložený řádek: 10 Testový řádek: 19 Režim: Vlastní".

Figure 7 : Example of error console.

Figure 6 : Example of LaTeX code.

Disadvantages?



Figure 8 : Error finding...
[layoutsparks.com]

Disadvantages?



Figure 8 : Error finding...
[layoutsparks.com]



Figure 9 : Error found.
[parganews.com]

What you need?

Overview

MikTeX

Distribution of TeX - MikTeX,
<http://miktex.org/>.
Instalation about 400 MB.
Compile *.tex file into *.ps or
*.pdf.

Editors

Some text editor (*TexStudio*,
TexMakerX...) or WYSIWYG
editor (*Bakoma*) and pdf/ps
viewer (*SumatraPDF*).

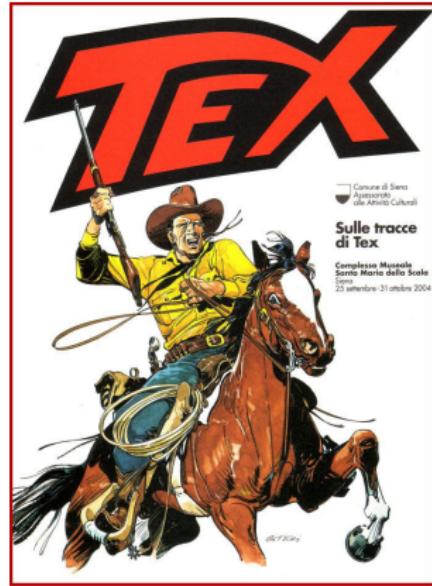


Figure 10 : TeX?
[comicbookdaily.com]

MiTeX instalation

MikTeX - instalation in czech with image wizard

<http://latex.feec.vutbr.cz/cz/latex/lokalni-instalace/>

<http://latex.feec.vutbr.cz/cz/latex/diskuze/>

or

<http://support.dce.felk.cvut.cz/lab26/download/LaTeX/TeXinst.pdf>

MiKTeX.3. Zvolte umístění instalace programu a další parametry instalace. Viz obrázky. Jako základní formát stránky nastavte **A4** a zvolte „**Ask me first**“ u budoucí instalace chybějících balíčků. Spusťte samotnou instalaci. Trvá relativně dlouho, kopíruje se a rozbaluje totiž spousta malých souborů.

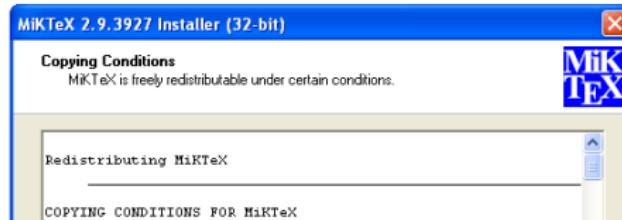


Figure 11 : <http://latex.feec.vutbr.cz>

TeXStudio

Instalation

<http://texstudio.sourceforge.net/> - portable version. According me best LaTeX editor - macros, help, integration with SumatraPDF.

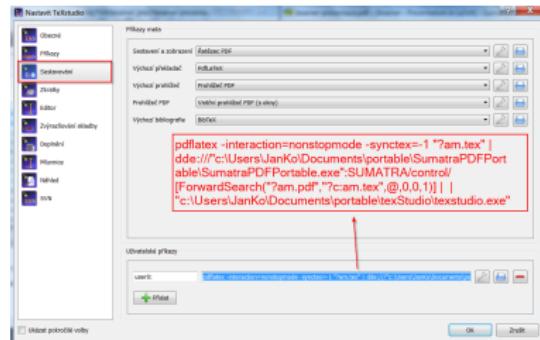


Figure 12 : Setting compilation.

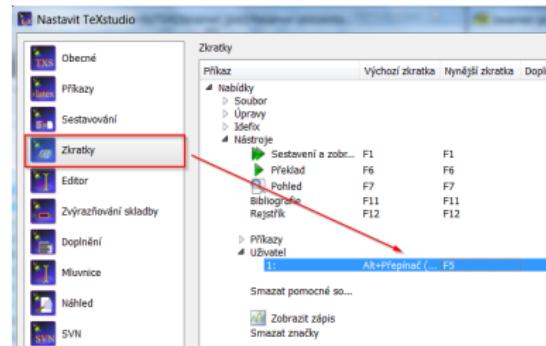


Figure 13 : Setting shortcut F5 for creating PDF.

SumatraPDF

Instalation

According me best LaTeX editor.
http://portableapps.com/apps/office/sumatra_pdf_portable-portable_version.

Forward and inverse search

When compile TeX to see actual page. When you click in the pdf document to see related code.

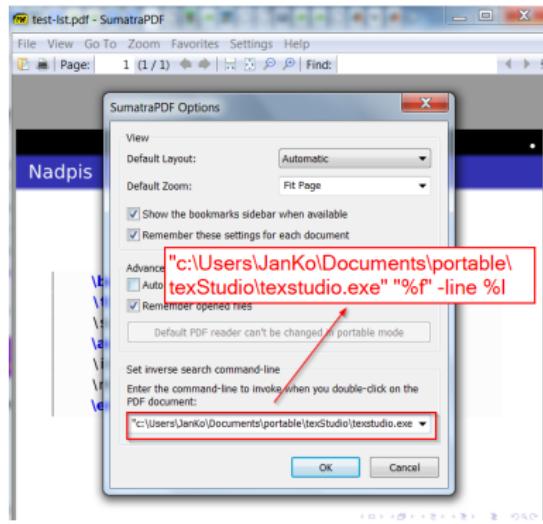


Figure 14 : SumatraPDF - setting inverse search

Another editors



Figure 15 : TeXnicCenter editor.
<http://www.texniccenter.org/>

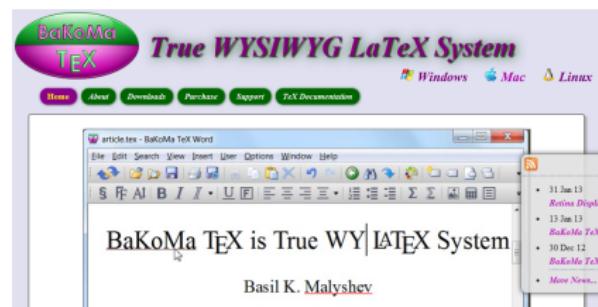


Figure 16 : BaKoMa - WYSIWYG editor.
<http://www.bakoma-tex.com/>

Philosophy

View output

Compilation

To view output pdf/ps you have to compile *.tex.

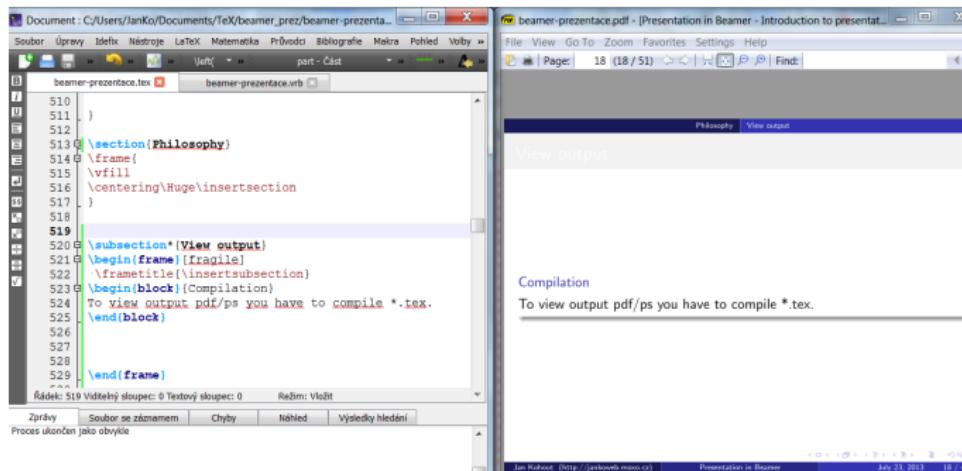


Figure 17 : TexStudio and SumatraPDF

Packages, commands

Packages

To use commands import packages.

`\usepackage{FILE}`

Important commands

`\` (backslash) - control char; escape char
`{}` (brackets) - block
command
command{parameters}
\command text
% comment

Examples

$\alpha, \phi, \Phi, \times, \neq, \spadesuit$

bold

small

`\alpha, \phi, \Phi`
`\times, \neq, \spadesuit`
`\textbf{bold}, {\small small}`

Syntax example

```
\documentclass{beamer}
\usepackage{NAME}
...
\begin{document}

\section{TITLE}
\frame{
  \frametitle{\insertsection}
  \begin{ENVIRONMENT}
    commands/text
  \end{ENVIRONMENT}
  % this is a comment
  Text...
}
...
\end{document}
```

Languages

In czech no problem, but beware of encoding

```
\usepackage[czech]{babel}  
\usepackage[utf8]{inputenc}
```

<http://jankoweb.moxo.cz/blog/skripty/>

prevadec-rozhazene-diakritiky-pri-kopirovani-z-pdf-vytvoreneho-latexem/

In english - have to use special syntax - e.g. "Příliš"

```
\usepackage[english]{babel}  
...  
\begin{document}  
P\v{r}'{i}li\v{s} ...  
\end{document}
```

Templates

```
\mode {  
 \usetheme{CambridgeUS}\usecolortheme{whale}  
 }
```



Figure 18 : Beamer templates gallery, hartwork.org.

<http://www.hartwork.org/beamer-theme-matrix/>

<http://jankoweb.moxo.cz/blog/odborny-sw/>

[beamer-sablony-a-materialy-k-tvorbe-profesionalnich-prezentaci/](http://jankoweb.moxo.cz/beamer-sablony-a-materialy-k-tvorbe-profesionalnich-prezentaci/)

Code examples

"Header"



Figure 19 : Header.

[webstory.my]

```
\documentclass{beamer}
\usepackage{epstopdf} % convert eps to pdf and using pdflatex
\usepackage[english]{babel}
\mode{
\usetheme{CambridgeUS}\usecolortheme{whale}
}
\usepackage{url}
```

First slide (setting)

```
\title{Presentation in Beamer}
\subtitle[pod]{Introduction to presentation in LaTeX}
\author{Jan Kohout}
\institute[CTU]{http://jankoweb.moxo.cz}

\newcommand{\supervisor}{}
```

\newcommand

For defining custom commands.

First slide (code)

```
\defbeamertemplate*{my title page}{default}[1][] { %
  \vbox{}\vfill
  \begin{centering}\begin{beamercolorbox}[sep=8pt,center,#1]{title
    \ifx\insertsubtitle\empty%
    \else%
      \vskip0.25em%
      {\usebeamertfont{subtitle}\usebeamercolor[fg]{subtitle}\i
    \fi%
  \end{beamercolorbox}%
  \vskip1em\par\begin{beamercolorbox}[sep=4pt,center,#1]{author
    \begin{beamercolorbox}[sep=4pt,center,#1]{institute}\usebeam
      \usebeamertfont{supervisor} Supervisor: \supervisor\end{beam
  }%
  \frame{ % MAIN SLIDE
    \usebeamertemplate{my title page}
  }
```

Outline, slides

```
\section*{Outline}
\frame{
  \frametitle{\insertsection}
  \tableofcontents
}

.
.
.

\section{TITLE}
\frame{
  \frametitle{\insertsection}
  Text...
}
```

\tableofcontents

Automatically generate outline from section, subsection...

Section, boxes, lists, fonts

Section, subsection

Appears in outline

```
\section{TITLE}
\subsection{TITLE}
\subsubsection{TITLE}
```

Not appears in outline - add star

```
\section*{TITLE}
\subsection*{TITLE}
\subsubsection*{TITLE}
```

Boxes

Block

```
\begin{block}{TITLE}  
Text...  
\end{block}
```

Alertblock

```
\begin{alertblock}{TITLE}  
Text...  
\end{alertblock}
```

Exampleblock

```
\begin{exampleblock}{TITLE}  
Text...  
\end{exampleblock}
```

List, columns

- text 1
- text 2

```
\begin{columns}
```

```
\column{5.5cm}
```

```
\begin{itemize}
```

```
\item text 1
```

```
\item text 2
```

```
\end{itemize}
```

```
\column{5.5cm}
```

```
\begin{enumerate}
```

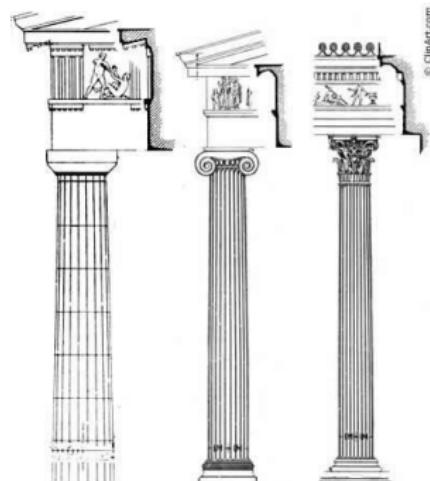
```
\item text 1
```

```
\item text 2
```

```
\end{enumerate}
```

```
\end{columns}
```

- ① text 1
- ② text 2



Comparison of Greek Columns: Doric, Ionic, and Corinthian

Figure 20 : Columns.

[0.tqn.com]

Font

tiny text small text large text Large text **huge text** Huge text

```
{\tiny tiny text}  
{\small small text}  
{\large large text}  
{\Large Large text}  
{\huge huge text}  
{\Huge Huge text}
```

bold, *italic*,

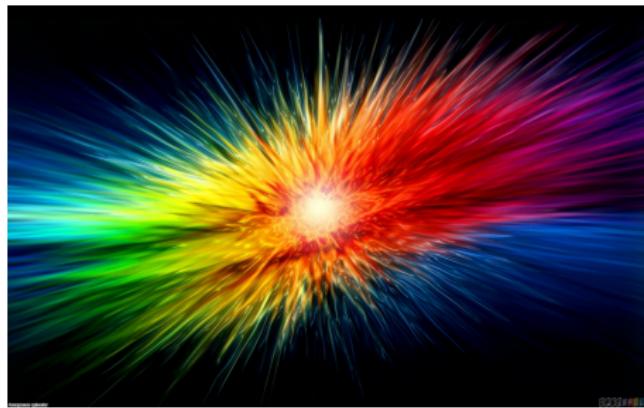
red, green, blue

<http://myweb.cz>

```
\textbf{bold}, \textit{italic},  
\color{red} red, {\color{green} green}, {\color{blue} blue}  
\url{http://myweb.cz}
```

Images, tables, reference

Images



Simply

Setting width, changing
image by changing source,
auto positioning...

Figure 21 : Image example.
[openwalls.com]

```
\begin{figure}[h]
\centering
\includegraphics[width=6cm]{img/image.png}
\caption{Image example}
\label{fig:image.png}
\end{figure}
```

Tables

Table 1 : Caption

0	705	1,48	37,9
0,43	683	2,43	37,7
0,94	661	3,46	37,4
1,38	644	4,33	37,2

\label{tab : reference}

Reference to table. How
to use below.

```
\begin{table} [H]
  \centering
  \caption{Caption}
  \vspace{0.2cm}

  \begin{tabular}{|c|l|r r|}
    \hline
    0 & 705 & 1,48 & 37,9 \\
    \hline\hline
    0,43 & 683 & 2,43 & 37,7 \\
    0,94 & 661 & 3,46 & 37,4 \\
    1,38 & 644 & 4,33 & 37,2 \\
    \hline
  \end{tabular}
  \label{tab:reference}
\end{table}
```

Citation, reference

See [2]. According to equation (5).

You can see on figure 5.

See `\cite{WWW}`. According to equation `\eqref{eq:example}`.

You can see on image `\ref{fig:advantages.png}`.

 JOSEPH J.M. BRAAT, PETER DIRKSEN, SVEN VAN HAVER,
AUGUSTUS J.E.M. JANSEN

Detailed description of the ENZ approach, 2005.

 JOSEPH J.M. BRAAT, PETER DIRKSEN, SVEN VAN HAVER,
AUGUSTUS J.E.M. JANSEN

Extended Nijboer-Zernike (ENZ) Analysis and Aberration Retrieval
[online 2012-07-24], <<http://www.nijboerzernike.nl/>>.

Reference (code)

```
\begin{thebibliography}{99}
    \bibitem{ENZ_math}
        \textsc{Joseph J.M. Braat, Peter Dirksen, Sven van Haver, Aug}
        \newblock \emph{Detailed description of the ENZ approach}, 20
    \bibitem{WWW}
        \textsc{Joseph J.M. Braat, Peter Dirksen, Sven van Haver, Aug}
        \newblock \emph{Extended Nijboer-Zernike (ENZ) Analysis and}
        \newblock \emph{Aberration Retrieval} [online]\hbox{[2012-07-24]}, $\langle$%
    \end{thebibliography}
```

Pause



Some text
\pause

Figure 22 : Pause.

[genome.duke.edu]

Pause



```
Some text  
\pause
```

```
Some text  
\pause
```

Figure 22 : Pause.

[genome.duke.edu]

Pause



Some text
\pause

Some text
\pause

Some text
\pause

Figure 22 : Pause.

[genome.duke.edu]

Math, source code, Matlab

Math

Expand $(a + b)^n$:

$$(a + b)^n \tag{1}$$

$$(a + b)^n \tag{2}$$

$$(a + b)^n \tag{3}$$

$$(a + b)^n \tag{4}$$

Expand $(a+b)^n$:

```
\begin{eqnarray}
(a + b)^n \\
(a + b)^n \\
(a\quad + \quad b)^n \\
(a\quad + \quad b)^n
\end{eqnarray}
```

Equations

Math in text

$$x = 7\alpha + 4\beta$$

```
| $x = 7 \, \backslash, \alpha + 4 \, \backslash, \beta$
```

Numbered equation

$$\frac{1}{2}, x_1, x^2, \lim_{s \rightarrow \infty} s, \int_{min}^{max} x^2 dx, \sum_{min}^{max} \beta = \pi \quad (5)$$

```
\begin{equation}
\frac{1}{2}, x_1, x^2, \lim_{s \rightarrow \infty} s, ...
\int_{min}^{max} x^2 dx, \sum_{min}^{max} \beta = \pi
\label{eq:example}
\end{equation}
```

Source code

```
\usepackage{color}  
\lstset{language=[LaTeX] Tex}
```

Usage in slides - don't forget "fragile"

```
\begin{frame}[fragile]{Source code}  
\begin{lstlisting}  
code  
\end{...}
```

Many languages supported

See http://en.wikibooks.org/wiki/LaTeX/Source_Code_Listings.

Matlab integration

`latex()`

Export output directly to LaTeX.

[http://jankoweb.moxo.cz/blog/skripty/
matlab2latex-prevadec-ceskeho-retezce-matlabu-do-formatu-latexu/](http://jankoweb.moxo.cz/blog/skripty/matlab2latex-prevadec-ceskeho-retezce-matlabu-do-formatu-latexu/)

File / Publish Configuration

Advanced export - directly to *.tex file. Example and more information

<http://jankoweb.moxo.cz/blog/odborny-sw/matlab-publikovani-m-filu/>.

Conclusion

Tips

Labels names

fig: for images, **eq:** for equations, **tab:** for tables.

Vector images (eps)

\usepackage{eps2pdf}

Macros

Shortcuts, macros,
symbol tables...

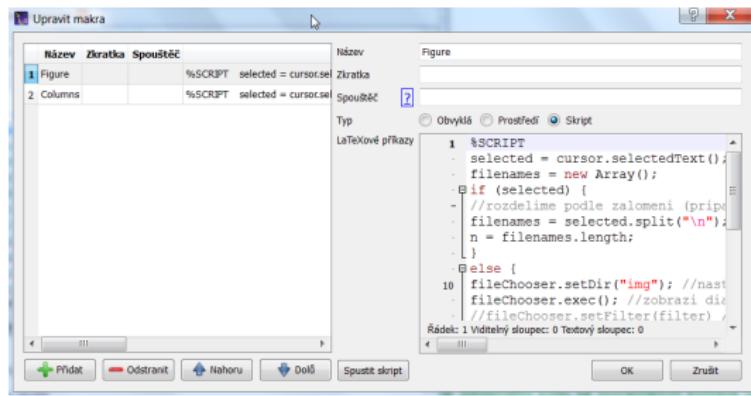


Figure 23 : Macros in TexStudio

Debugging

Code examples | In

Citation, reference

See [2]. According to equation (??).

Figure 24 : Bad reference or first compilation.

Frequent errors

- forgotten \usepackage
- forgotten end of brackets }
- forgotten \end{environment}
- using "_" in text mode
- using special chars in text mode
- using math symbols in text mode

Tip

Often compiler report error at another place that occurs. You don't know nothing from error message? Google it.

Debugging II

The screenshot shows a LaTeX editor window with a red error marker pointing to a line of code. The code is as follows:

```

38 }
39
40
41 \usepackage{courier}
42
43 \usepackage{bera} % change font
44 \usepackage{color}
45 \definecolor{lightgrey}{rgb}{0.99,0.99,0.99} %
  defining color for listing
46 \definecolor{darkgreen}{rgb}{0,0.6,0} % defining
  color for listing
47 \lstset[language=[LaTeX]Tex,
48 texcsstyle=*\bf\color{blue},
49 numbers=none,
50 breaklines=true,
51 keywordstyle=\color{darkgreen},

```

The editor highlights the word "numbers" in blue, "breaklines=true" in green, and "keywordstyle=" in red. A red arrow points from the word "numbers" to the line number 47, indicating a syntax error.

To the right of the editor, a PDF viewer shows the generated Beamer presentation slide. The title of the slide is "Beamer Presentation in LaTeX". The slide content is:

```

language=[LaTeX]Tex, texcsstyle=*, numbers
breaklines=true, keywordstyle=, commer
morekeywords=, frame=leftline, tabsize=
backgroundcolor=

```

Figure 25 : Forgotten usepackage.

Summary

Quick start

- MikTeX
- TeXStudio
- SumatraPDF

Steps for presentation in PDF

Editor → *.tex file → PDF

*.tex Beamer template

[http://jankoweb.moxo.cz/blog/odborny-sw/
beamer-sablon-a-prezentace-pro-latex/](http://jankoweb.moxo.cz/blog/odborny-sw/beamer-sablon-a-prezentace-pro-latex/)

Thank you for attention!

Reference

For beginners

<http://www.abclinuxu.cz/clanky/latex-pro-zacatecniky> - course of LaTeX.

<http://www.abclinuxu.cz/clanky/navody/beamer-latex-na-prezentace> - course of Beamer.

<http://www.it.cas.cz/manual/latex/> - huge course of LaTeX.

<http://support.dce.felk.cvut.cz/pub/roubalj/teaching/latex.php> - tex templates and something about typography.

Advanced

<http://jankoweb.moxo.cz/blog/odborny-sw/> - my experiences.

<http://tex.stackexchange.com/> - when you need a help.

<http://stackoverflow.com/> - find "latex".

<http://www.it.cas.cz/manual/latex/n.html> - about macros.