LaTeX and MiKTeX
Introduction Part 2

http://www.win.tue.nl/~jknopper/latex/intro/

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Contents

Tables

The environments array and tabular create tables and matrices. The usage of array is the same as for tabular, but it can only be used in math mode.

```
\begin{array}[pos]{cols}
  rows
\end{array}

\begin{tabular}[pos]{cols}
  rows
\end{tabular}
```

The pos argument defines the vertical positioning for the table: t or b (top or bottom)

Tables

The cols argument defines the column formatting. The possible formatting symbols are:

l	the column contents are left justified
r	the column contents are right justified
c	the column contents are centered
p{*width*}	the text in this column is set in a paragraph box of the specified width.
|	draws a vertical line
||	draws a double vertical line

Tables

The rows contain the actual entries. Each row is terminated with the \\ command. The column entries are separated by a & symbol.

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The command \hline draws a horizontal line over the full width.
The command \cline{m-n} draws a horizontal line from the left of column m to the right of column n.

Tables

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The command **hline** draws a horizontal line over the full width.
The command **cline**{m-n} draws a horizontal line from the left of column m to the right of column n.

The command **multicolumn**{n}{col}{text} creates a table cell that extends n columns. The column formatting for this cell is defined by col.

Tables

Example 1

Stand Eredivisie 26 maart 2008							
		P	W	D	L	Pts	+/-
1	PSV	30	19	7	4	64	61 - 23
2	Ajax	30	16	9	5	57	79 - 40
3	sc Heerenveen	30	16	6	8	54	76 - 38
4	Feyenoord	30	16	6	8	54	56 - 34
5	NAC Breda	30	16	6	8	54	41 - 35
6	FC Twente	30	14	10	6	52	47 - 31
7	FC Groningen	30	15	5	10	50	50 - 48
8	Roda JC	30	11	10	9	43	51 - 49
9	FC Utrecht	30	12	6	12	42	56 - 50
10	Vitesse	30	11	7	12	40	42 - 51
11	NEC	30	11	6	13	39	43 - 49
12	AZ	30	8	9	13	33	41 - 49
13	Heracles Almelo	30	8	7	15	31	33 - 56
14	Sparta Rotterdam	30	8	6	16	30	46 - 68
15	De Graafschap	30	7	7	16	28	30 - 55
16	Willem II	30	7	6	17	27	33 - 41
17	VVV-Venlo	30	6	8	16	26	37 - 67
18	Excelsior	30	6	5	19	23	29 - 67

Tables

Example 1

```
\begin{tabular}{|l|l|cccc|r|c|}
\hline
\multicolumn{8}{|c|}{Eredivisie 26 maart 2008} \\
\hline
 &  & P & W & D & L & Pts & +/- \\
\hline
1 & PSV  &  30 & 19 & 7 & 4 & 64 & 61 - 23 \\
2 & Ajax &  30 & 16 & 9 & 5 & 57 & 79 - 40 \\

...

18 &  Excelsior & 30 & 6 & 5 & 19 & 23 & 29 - 67 \\
\hline
\end{tabular}
```

Example 2

Model	Description	Price
FBD 360	**Desktop:** XP3600+ Processor, 512 MB DDR-RAM, 80 GB Hard disk, 16x DVD drive, 32x CDRW drive, 64 MB TV output, Windows XP, 15" monitor	€ 999.00
FBD 480	**Desktop DeLuxe:** Same as FBD 360 but with XP4800+ Processor, 48x CDRW drive, 17" monitor	€ 1399.00

Example 2

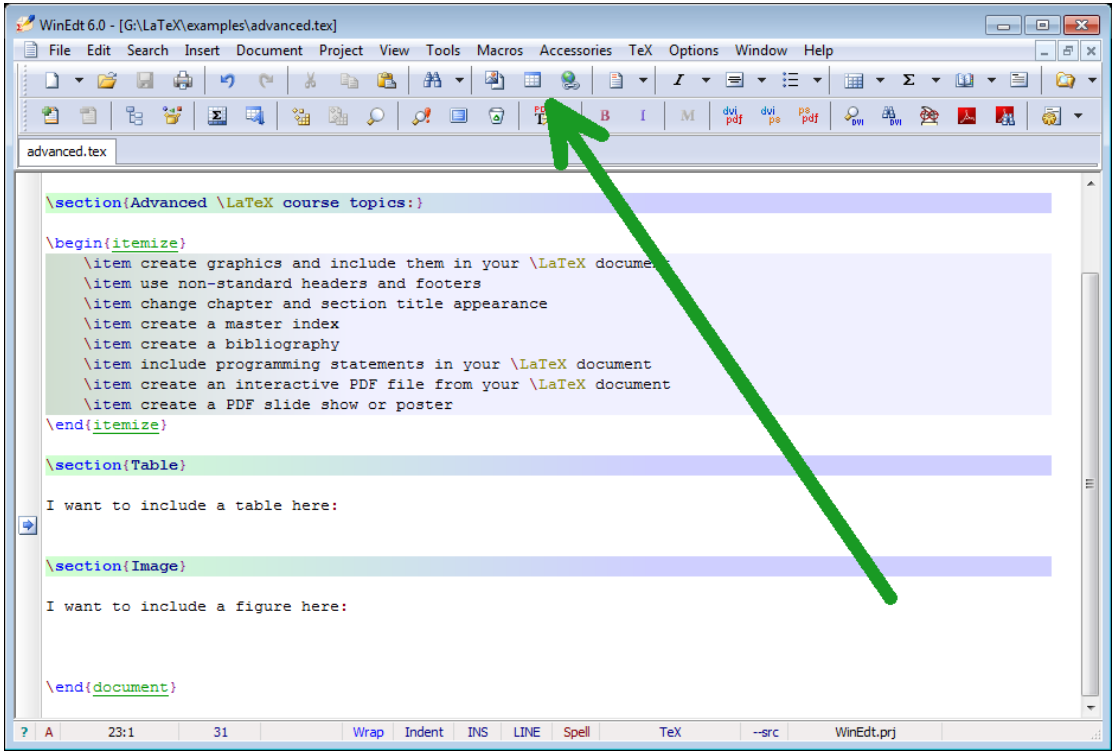
```
\begin{tabular}{lp{0.5\textwidth}r}
\bfseries Model & \bfseries Description &
\bfseries Price \\[1ex]

FBD 360 & \small \textbf{Desktop}: XP3600+
Processor, 512~MB DDR-RAM, 80~GB Hard disk,
16x DVD drive, 32x CDRW drive, 64~MB TV output,
Windows~XP, 15" monitor & \EUR{} 999.00 \\

FBD 480 & \small \textbf{Desktop DeLuxe}: Same
as FBD 360 but with XP4800+ Processor, 48x CDRW
drive, 17" monitor & \EUR{} 1399.00 \\
\end{tabular}
```

Tables

WinEdt has a useful plug-in to insert tables:



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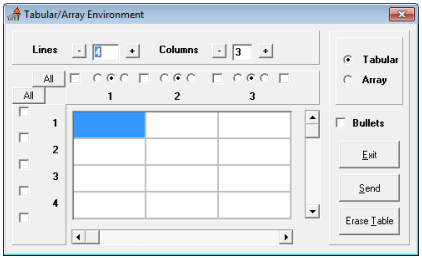

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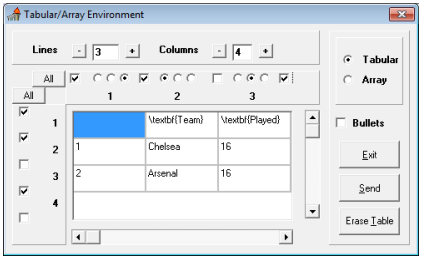

Tables

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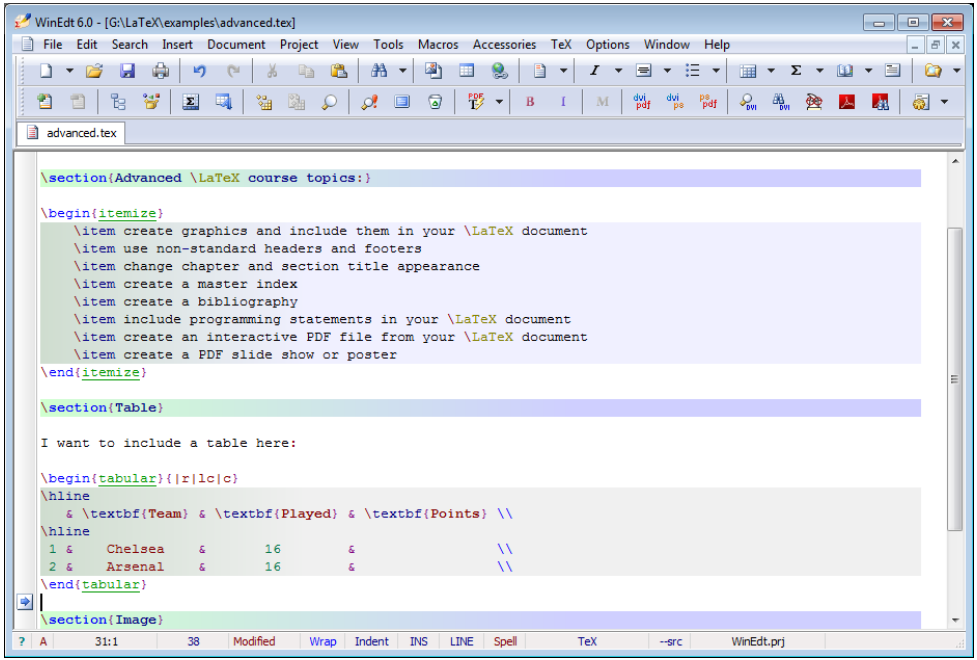

Tables

Excel to LaTeX Add-In

1. download the Excel macro: Excel2LaTeX.xla
2. Start Excel and install the Add-in:
   - Click on the Office button (in the upper left corner)
   - Excel Options
   - Add-Ins
   - Go...
   - Browse...
   - Browse for the Add-In and click Ok
3. Restart Excel
4. A button has been added to the Add-Ins tab: 
5. Create a table in Excel, select the table and press this button.
6. Copy-paste to WinEdt

Including programming statements

The package listings formats listings. It defines the following commands:

- `\lstlisting{...}` for inline programming statements.
- `\begin{lstlisting} ... \end{lstlisting}` for multi-line listings.
- `\lstinputlisting{filename}` imports a complete source file

Including programming statements

Customizing listings

Using the command \lstset you can customize the language and appearance of the listing:

```
\lstset{
    language=Java,
    basicstyle=\color{black}\ttfamily,
    commentstyle=\color{green}\itshape\ttfamily,
    keywordstyle=\color{blue}\bfseries\ttfamily,
    showstringspaces=false,
    frame=single, % boxed listings
    backgroundcolor=\color{white}
}
```

Supported languages: too many to mention. Included are Basic, C, C++, Delphi, Fortran, HTML, Java, Mathematica, Matlab, Pascal, Perl, PHP, SAS, SQL, TeX, VBScript, XML.

Customizing listings

Alternatively, you can specify options like this:

```
\definecolor{myyellow}{rgb}{1.00,1.00,0.50}
\begin{lstlisting}[language=Pascal,
                   backgroundcolor=\color{myyellow}]
  readln(N);
  for i := 1 to N do
  begin
    writeln(random)
  end
\end{lstlisting}
```

Including programming statements

Customizing listings

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```
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  end
```

WinEdt - Working with a main file

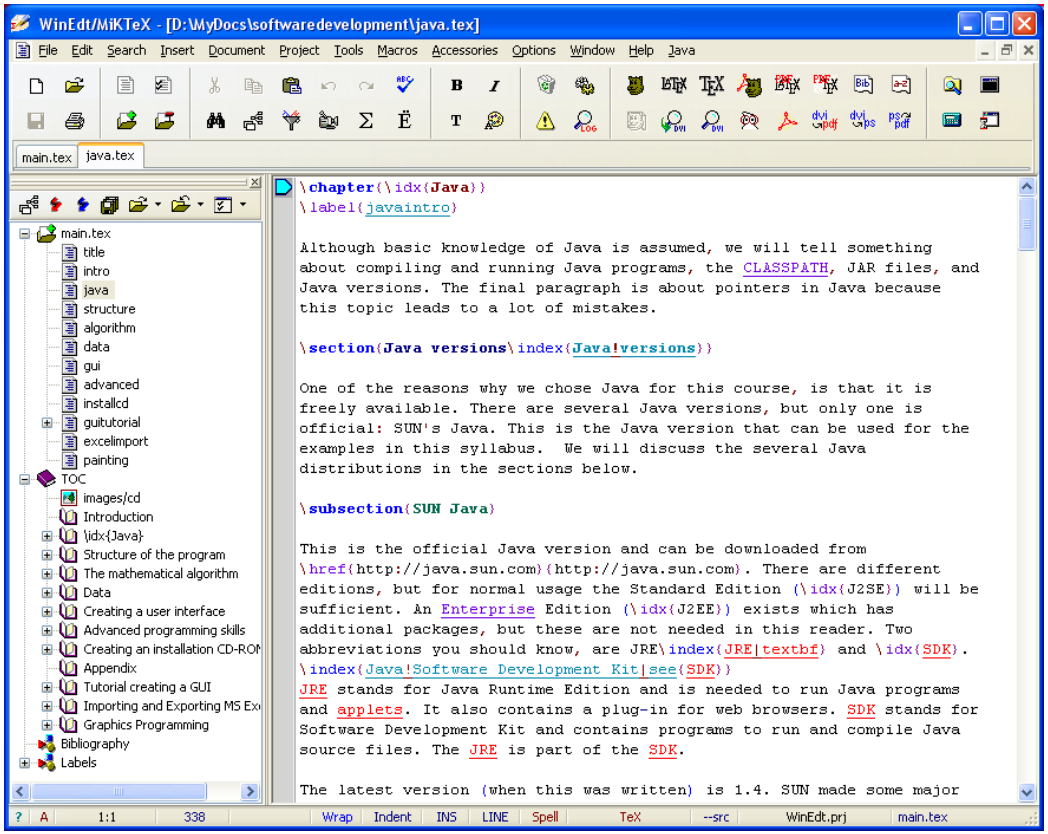
In bigger documents one often has one main file which includes several sub-documents: `\input chapter1` etc.. WinEdt has special functionality to deal with this document structure:

declares the current file as main file. This means that the programs `latex, yap, dvips, gsview, pdflatex` operate on this main file, even if another document is opened in WinEdt.

does not consider the current file as main file anymore. The file that is currently open will be LaTeXed.

displays the project tree (main file, input files, table of contents, bibliography and labels. You can click on files in this tree to open them.

WinEdt - Working with a main file



WinEdt - Working with a main file

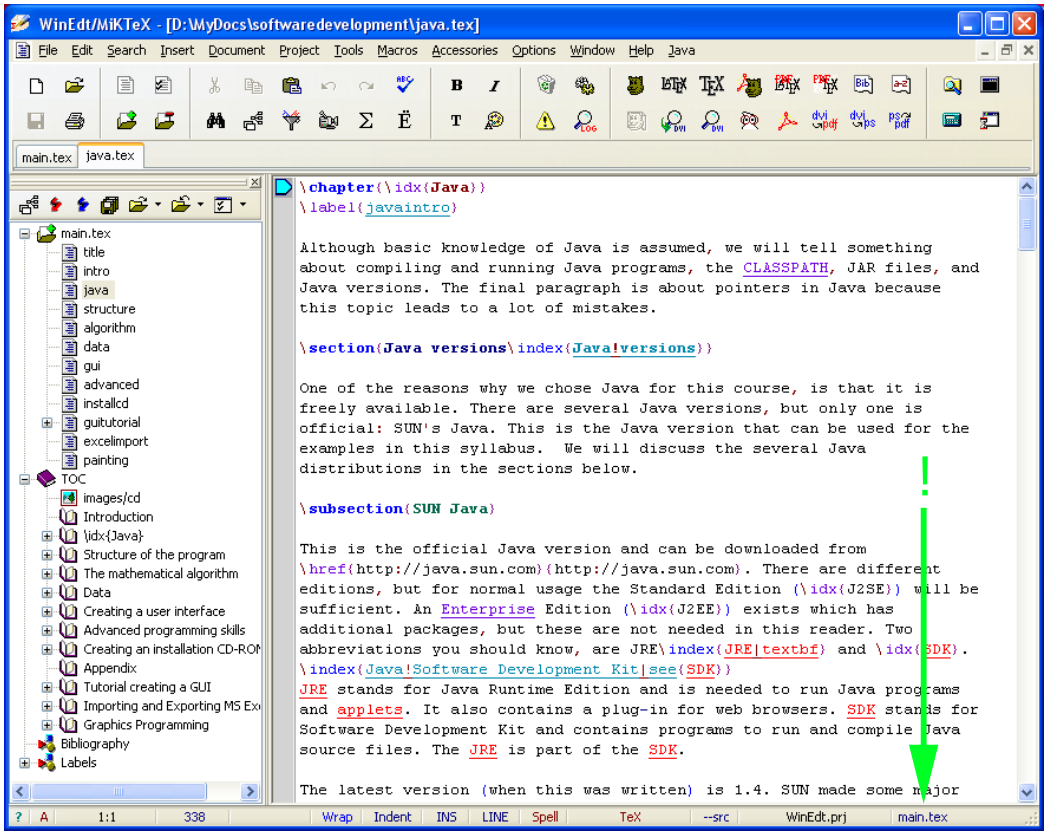


Table of Contents

The table of contents is generated and printed with the command `\tableofcontents` (normally after title page and abstract).
All entries are created automatically, based on the sectioning commands. You have to run `latex` twice to get all references right! It is recommended to use the `texify` command.

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To create additional entries manually, use the command:
`\addcontentsline{toc}{section type}{entry text}`

```
\appendix
\addcontentsline{toc}{chapter}{\noindent Appendix}
\chapter{Source code}
```

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`\addcontentsline{toc}{section type}{entry text}`

```
\appendix
\addcontentsline{toc}{chapter}{\noindent Appendix}
\chapter{Source code}
```

Depth of TOC entries (do not include subsubsections):

```
\setcounter{tocdepth}{2}
```

Page Numbering

You can set the page number manually:

```
\setcounter{page}{14}
```

Page Numbering

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```
\setcounter{page}{14}
```

You can also control the style of the page numbering:

```
\pagenumbering{style}
```

The allowed styles are:

arabic	normal (Arabic) numerals: $1, 2, 3, 4$
roman	lowercase Roman numerals: i, ii, iii, iv
Roman	uppercase Roman numerals: I, II, III, IV
alph	for lowercase letters: a, b, c, d
Alph	for uppercase letters: A, B, C, D

Book Structure

To simplify the structuring of the book, use the commands:

```
\frontmatter
\mainmatter
\backmatter
```

Front matter: preface, table of contents
Main matter: main body of text
Back matter: bibliography, index

Front matter has Roman page numbering and suppresses the numbering of chapters. Back matter also has unnumbered chapters. The page number is reset for the main matter.

Multicolumn Text

- The document class option twocolumn sets the entire document in two columns per page

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```
\onecolumn
\twocolumn[header text]
```

Please note that these commands start a new page.

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```
\onecolumn
\twocolumn[header text]
```

Please note that these commands start a new page.

- To select a different number of columns within one page, use the multicols environment which is defined in the package multicol:

```
\usepackage{multicol}
...
\begin{multicols}{3}[header text]
Text set in 3 columns.
\end{multicols}
```

Footnotes

Footnotes are generated with the command `\footnote{text}`.
Example:

```
This section is about footnotes.\footnote{The
standard footnote marker is a small, raised number.}
```

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```
This section is about footnotes.\footnote{The
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```

This section is about footnotes.[1]

[1] The standard footnote marker is a small, raised number.

Fonts

TU/e Fonts

In preamble:

```
\usepackage[T1]{fontenc}
```

To change the font defaults:

```
\renewcommand{\sfdefault}{zmb}
\renewcommand{\rmdefault}{zmb}
\renewcommand{\ttdefault}{pcr}
\fontfamily{\rmdefault}
\selectfont
```

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\fontfamily{\rmdefault}
\selectfont
```

Note: the deprecated serif font “TU/e Scala” can be loaded using:

```
\renewcommand{\rmdefault}{zsc}
```

Fonts

- Mathtime

```
\usepackage[T1]{fontenc}
\usepackage{mathtime}
```

This is an *italic* or **bold** test

- Helvetica (looks like Arial)

```
\renewcommand{\sfdefault}{phv}
\renewcommand{\rmdefault}{phv}
```

This is an *italic* or **bold** test

Non-standard headers and footers

The package fancyhdr (previously known as fancyheadings) defines commands that let you control headers and footers:

```
\lhead{...}     \chead{...}     \rhead{...}

\lfoot{...}     \cfoot{...}     \rfoot{...}
```

If you want to distinguish between odd and even pages, it becomes slightly more complicated:

```
\fancyhead[RO, LE]{...}

\fancyfoot[C]{...}
```

L = Left, C = left, R = right, O = odd, E = even.

You have to specify that pagestyle should be fancy (instead of plain or empty).

fancyhdr - Example

```
\pagestyle{fancy}
\fancyhf{}
\fancyhead[CE]{\sffamily\leftmark}
\fancyhead[CO]{\sffamily\rightmark}
\fancyfoot[RO]{\thepage\ of \pageref{LastPage}}
\fancyfoot[LE]{\thepage\ of \pageref{LastPage}}

\renewcommand\chaptermark[1]{%
  \markboth{\chaptername\ \thechapter\ #1}{}}
\renewcommand\sectionmark[1]{%
  \markright{\thesection\ #1}}
\renewcommand\headrulewidth{0.4pt}
```

Please note that the LastPage reference is only available if you load the package lastpage. You have to LaTeX your document twice before it works.

Exercise

1. Include the image `snowwhite.jpg` on the title page. Make sure that your document runs with `latex` and `pdflatex`!
2. Change the page numbering to uppercase Roman numbering.
3. Find the second line in chapter 4.2 (They were seven dwarfs . . .) and create a footnote at this place. It should say: Walt Disney was the first one to give names to the dwarfs: Dopey, Grumpy, Doc, Happy, Bashful, Sneezy and Sleepy.
4. Change the default fonts of the document to TU/e fonts.
5. Create headers and footers just like in the fancyhdr example.

Mathematical formulas

In a text:

> For a rectangular triangle, we know from *Pythagoras' theorem* that $a^2 + b^2 = c^2$ where a and b are the length of two sides adjoining the straight angle while c is the length of the side opposite the straight angle.

Compare this with:

> For a rectangular triangle, we know from *Pythagoras' theorem* that $a^2+b^2=c^2$ where a and b are the length of two sides adjoining the straight angle while c is the length of the side opposite the straight angle.

Mathematical formulas

Mathematical formulas are created as follows:

```
We get: $a^2+b^2=c^2$, $a^{13}$, $b_3$ or $b_13$
```

results in

We get: $a^2 + b^2 = c^2$, a^{13}, b_3 or $b_1 3$

Mathematical formulas

Mathematical formulas are created as follows:

```
We get
\[
  a^2+b^2=c^2, a^{13}, b_3 \mbox{ or } b_13
\]
```

results in

We get

$$a^2 + b^2 = c^2, a^{13}, b_3 \text{ or } b_13$$

Mathematical formulas

We can also number our equations:

```
We get
\begin{equation} \label{one}
  a^2+b^2=c^2, a^{13}, b_3 \mbox{ or } b_13
\end{equation}
```

results in

We get

$$a^2 + b^2 = c^2, a^{13}, b_3 \text{ or } b_1 3 \tag{1}$$

Mathematical formulas

We can also have multiple equations:

```
\begin{eqnarray}
  x & = & r\sin \varphi \label{11} \\
  y & = & r\cos \varphi \nonumber \\
  z & = & z \label{33}
\end{eqnarray}
```

$$x = r \sin \varphi \tag{2}$$
$$y = r \cos \varphi$$
$$z = z \tag{3}$$

Mathematical formulas

or without numbers:

```
\begin{eqnarray*}
  x & = & r\sin \varphi   \\[-0.2cm]
  y & = & r\cos \varphi   \\
  z & = & z
\end{eqnarray*}
```

$$
\begin{aligned}
x &= r \sin \varphi \\
y &= r \cos \varphi \\
z &= z
\end{aligned}
$$

Mathematical formulas

Obviously we can do more:

```
$\frac{n}{n+p^2} \int_0^\infty
\sqrt[n]{x^n-\sin y} \textrm{d}x$
```

$$\frac{n}{n+p^2} \int_0^\infty \sqrt[n]{x^n - \sin y}\mathrm{d}x$$

Mathematical formulas

On the other hand:

```
\[
\frac{n}{n+p^2} \int_0^\infty
\sqrt[n]{x^n-\sin y}\, \textrm{d}x
\]
```

$$\frac{n}{n+p^2}\int_0^\infty \sqrt[n]{x^n-\sin y}\,\mathrm{d}x$$

Mathematical formulas

and finally:

```
$\displaystyle \frac{n}{n+p^2} \int_0^\infty
\sqrt[n]{x^n-\sin y}\; \textrm{d}x$
```

$$\frac{n}{n+p^2}\int_0^\infty \sqrt[n]{x^n-\sin y}\,\mathrm{d}x$$

Mathematical formulas

Functions

```
$\sin x,\; sin x, \;  \mbox{sin} x$
```

$\sin x,\ sinx,\ \mathsf{sin}x$

Mathematical formulas

Brackets

```
$\displaystyle (\frac{n}{\frac{n}{n+p}+1})
    + \left( \frac{n}{\tfrac{n}{n+p}+1} \right)$
```

$$(\frac{n}{\frac{n}{n+p}+1}) + \left(\frac{n}{\frac{n}{n+p}+1}\right)$$

Inline floats

The package wrapfig makes it possible to place text next to floats:

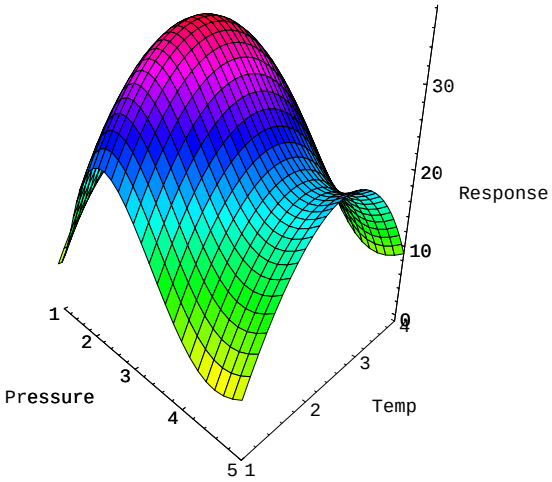
```
\begin{wrapfigure}{placement}[overhang]{width}
\includegraphics[width=\linewidth]{image}
\end{wrapfigure}
```

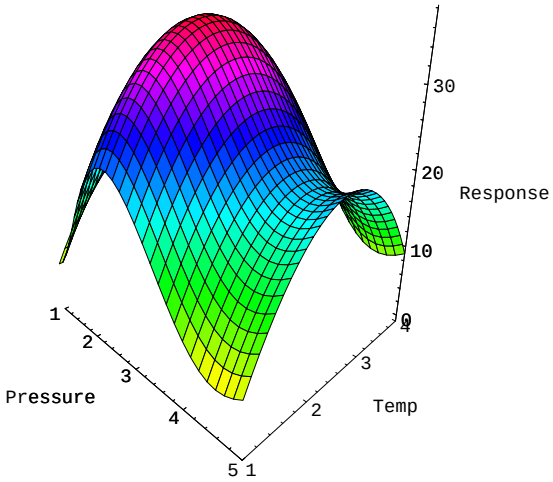
placement	horizontal placement: l (left) or r (right). For two-sided documents: i (inside edge) or o (outside edge).
overhang	overhang of the float into the margin (default: 0pt).
width	width of the figure or table (use `wraptable` for tables).

Two floats next to each other

1. No caption

```
\includegraphics[width=0.45\linewidth]{pic1}
\hfill
\includegraphics[width=0.45\linewidth]{pic2}
```

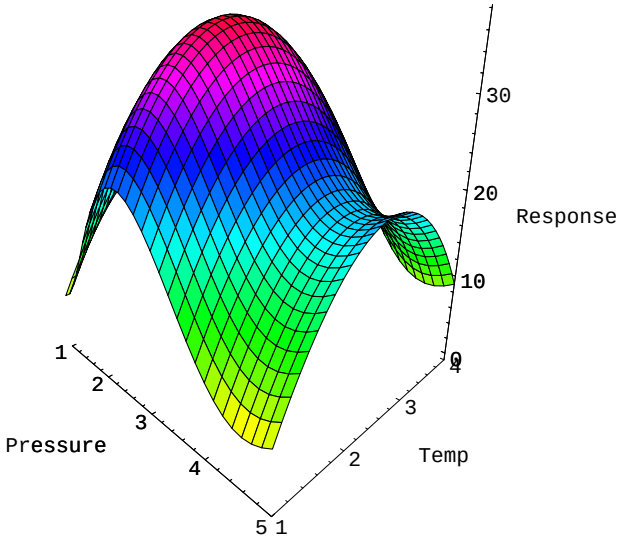




Two floats next to each other

2. One caption

```
\begin{figure}[ht]
\includegraphics[width=0.45\linewidth]{pic1}
\hfill
\includegraphics[width=0.45\linewidth]{pic2}
\caption{a response surface.}
\label{fig:surface}
\end{figure}
```



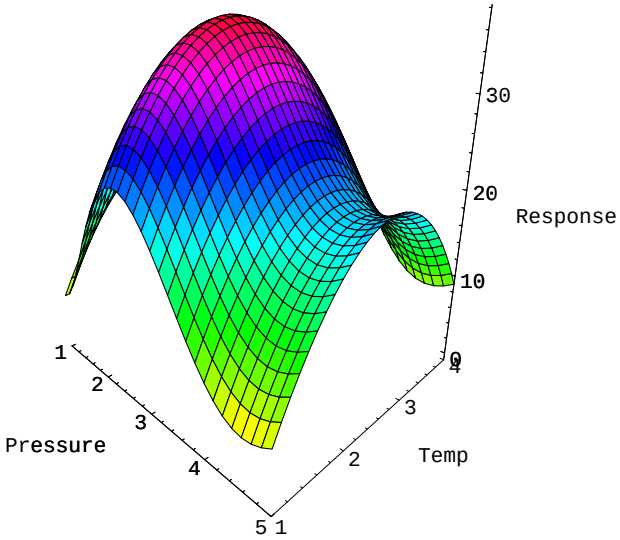


Figure 1: a response surface.

Two floats next to each other

3. Two captions

Now we need the package caption. This package has very extensive functionality to change the appearance of captions. In this case we are only going to use the new command `\captionof`.

```
\parbox[t]{0.45\textwidth}{
  \includegraphics[width=\linewidth]{pic1}
  \captionof{figure}{the first figure}
}
\hfill
\parbox[t]{0.45\textwidth}{
  \includegraphics[width=\linewidth]{pic2}
  \captionof{figure}{the second figure}
}
```

For tables, just repace figure by table.

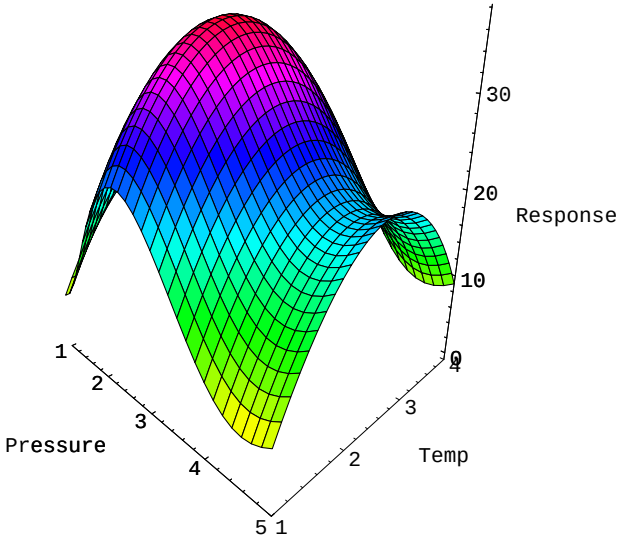


Figure 2: the first figure

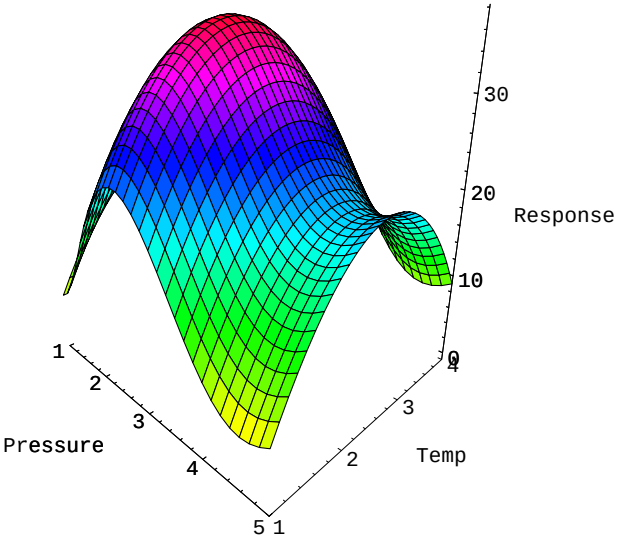


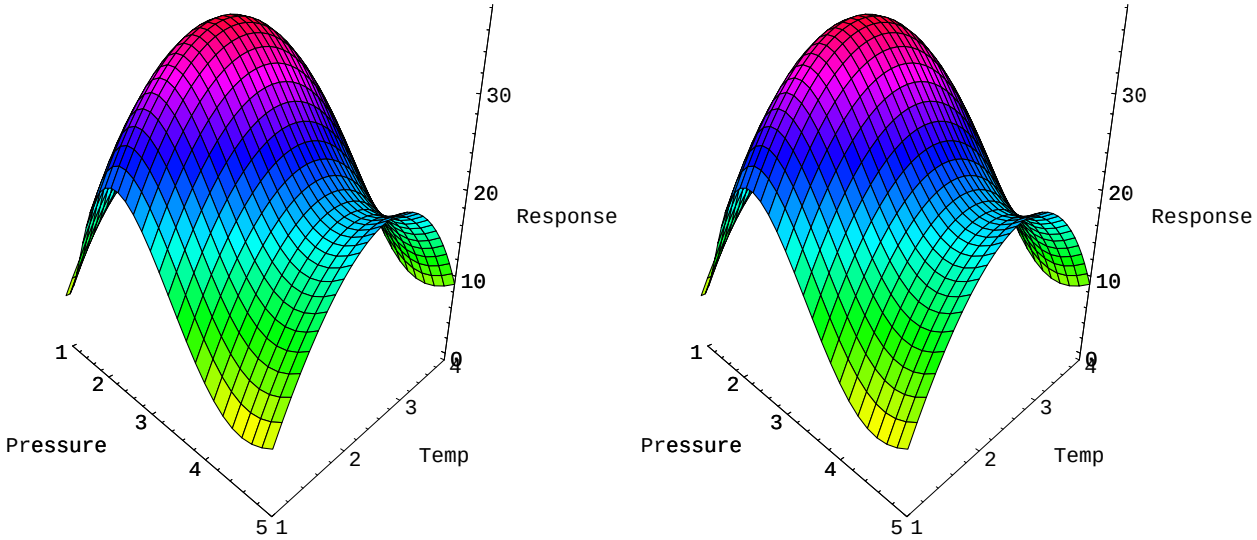
Figure 3: the second figure

Two floats next to each other

4. Sub-captions

Now we need the package subfig:

```
\begin{figure}[ht]
\begin{center}
\subfloat[First figure]{
  \includegraphics[width=0.45\textwidth]{pic1}
}
\subfloat[Second figure]{
  \includegraphics[width=0.45\textwidth]{pic2}
}
\caption{Two figures}
\end{center}
\end{figure}
```



(a) First figure

(b) Second figure

Figure 4: Two figures

Creating a master index

To create a master index, just follow these steps:

1. include the package makeidx.
2. add the command `\makeindex` before `\begin{document}`
3. add words to the index with the command `\index{word}`. Please note that this command does not display the word. It might be useful to define a command:

```
\newcommand{\idx}[1]{#1\index{#1}}
```

4. put the following commands at the location where you want the index:

```
\newpage\cleardoublepage
\printindex
```

   This makes sure that the index will start on an odd page.

5. run LaTeX twice, then run `makeindex`  and run LaTeX again.

Creating a master index

Special index formats

Use this to point to another word:

```
\index{looking-glass|see{mirror}}
```

Use this to make the page number bold:

```
\index{forest|textbf}
```

Use this to make sub categories:

```
\index{plan!first}
\index{plan!second}
```

Use this to span multiple pages:

```
\index{Snow white|(}
\index{Snow white|)}
```

Slide shows and posters

The package pdfscreen was written for PDF slide show presentations. Unfortunately this package contained some bugs, so another package was written: tuepdfscreen2008
This package can be used to create PDF slide shows. The default appearance is in the TU/e style (colours, fonts) but this can be modified. In fact, any Powerpoint style can be converted to PDF which makes it suitable for TU/ePDFScreen.

Detailed information about TU/ePDFScreen (and TU/e posters, reports, letters, faxes) can be found in the MiKTeX 2.8/Documentation start menu group.

Converting your LaTeX document to a slide show

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\usepackage[wtbuk]{tuepdfscreen2008}
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5. run PDFLaTeX on the file.
6. if you used the \pause command, run the program AddPause that can be found in the MiKTeX Start Menu program group.

Slide shows and posters

Converting your LaTeX document to a slide show

```
\documentclass[a4paper]{article}


\begin{document}


\section*{An example}

\begin{eqnarray*}
\lim_{x \rightarrow 0} \frac{\sin x}{x} &=& 1\\

\sum_{k=0}^\infty x^k &=& \frac{1}{1-x} (|x| < 1)
\end{eqnarray*}

\end{document}
```

Slide shows and posters

Converting your LaTeX document to a slide show

```
\documentclass[a4paper]{article}
\usepackage[wtbuk,themeblue]{tuepdfscreen2008}

\begin{document}
\begin{slidetop}
\slidetitle{Mathematics}
\section*{An example}

\begin{eqnarray*}
\lim_{x \rightarrow 0} \frac{\sin x}{x} &=& 1\\
\pause
\sum_{k=0}^\infty x^k &=& \frac{1}{1-x} (|x| < 1)
\end{eqnarray*}
\end{slidetop}%
\end{document}
```

An example

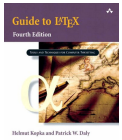
$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

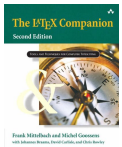
An example

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

$$\sum_{k=0}^{\infty} x^k = \frac{1}{1-x} (|x| < 1)$$

I want to know more about LaTeX!!!

- The LaTeX manual, written by Piet van Oostrum. This is available at the sales point of TU/e syllabi. PDF version already on your laptop!
- 

A Guide to LaTeX, by Helmut Kopka. ISBN 0-321-17385-6.
- 

The LaTeX Companion Second Edition, by Mittelbach and Goossens. ISBN 0-201-36299-6.
- TU/e LaTeX FAQ: http://www.win.tue.nl/latex
- information about a package: Start Menu, MiKTeX group, Documentation, LaTeX Packages Help.