

# The title of the talk can even be much longer than this

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## Basics

Statistics is understanding data by modelling it.

Data  $Y^{(n)} = (Y_1, \dots, Y_n)$  usually *random*.

$\mathbb{P} = \mathcal{L}(Y^{(n)})$ , the *unknown* joint distribution.

Statistical problem: to infer on  $\mathbb{P}$  from the data  $Y^{(n)}$ .

*Parametric* modelling:

$$\mathbb{P} = \mathbb{P}_{\boldsymbol{\theta}} \in \{\mathbb{P}_{\boldsymbol{\theta}}, \boldsymbol{\theta} \in \Theta \subset \mathbb{R}^p\}.$$

*Nonparametric* modelling: the parametric assumption is not fulfilled, or, equivalently,  $p = \infty$ .



## Outline

1. Attract the audience ✓
2. The scientific message
3. Explain the method
4. Simulations & discussion of your results
5. Applications and examples
6. Almost EOT = end of talk
7. Provoke few questions
8. Audience: enjoy what you have learnt

Short Title - please modify the figure in the lower right corner: —



# The Beamer-Package

- Beamer is the latest package to create slides with  $\text{\LaTeX}$
- Slides need to be compiled to PDF, not DVI/Postscript
- Remember: PDFLaTeX accepts PNG, JPEG and PDF not EPS/PS
- If you *need* Postscript, RTFM



## The LvB Beamer Style

- The LvB Beamer Style is defined via *beamerdefs.sty*, *colordef.sty* and *lvblisting.sty*, which must always be provided in the source folder.
- All operators are to be defined by `\operatorname{}`. Note the difference:

$\operatorname{Var}$     defined by `operatorname`  
 $Var$        not defined by `operatorname`

- Remember to start and end the `displaymath` environment by `\[` and `\]` and not `$$`.



## Predefined comands

- For your convenience you may set up new commands via `\newcommand{}{}`.

- This has been done in the two following cases:

- ▶ Use `\quantnet` to include the quantnet icon (right-aligned):



The name of the quantnet is to be written in black.

- ▶ Use `\BBI{}` to link to the BBI:

*Carl Friedrich Gauss* on BBI: 

- Some commands are already defined, e.g. `\ln` and `\log`



## Equations

- Equations covering several lines may be written in the *align* environment instead of the older *eqnarray* environment. Only this way it can be ensured, that the colour of the equation and of the according equation numbering match.
- `align*` omits the equation numbering, as does `\notag`.

```
1 \begin{align}  
2 4x + 8 &= (3-2)^2\\  
3 4x &= -7 \notag \\  
4 x &= -\frac{7}{4}  
5 \end{align}
```

$$4x + 8 = (3 - 2)^2 \quad (1)$$

$$4x = -7$$
$$x = -\frac{7}{4} \quad (2)$$



## Tables

Title	Title
2.13	1.45
3.14	6.85

Table 1: Include a short, but meaningful caption.

- Follow the Cambridge University Press Style.
- Not more than 2 decimal digits in a column.
- Tables and their captions are to be written in black.

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## Tables

```
1 \begin{table}
2 \begin{center}
3 \begin{tabular}{cc}
4 \hline\hline
5 Title & Title\\
6 \hline
7 2.13 & 1.45 \\
8 3.14 & 6.85 \\
9 \hline\hline
10 \end{tabular}
11 \caption{Include a short, but meaningful caption.}
12 \end{center}
13 \end{table}
```

Short Title - please modify the figure in the lower right corner: —



## Figures

```
1 \begin{figure}[htb]
2   \begin{center}
3     \includegraphics[
4       scale=0.2]{
5         Figures/vola}
6     \caption{Include a
7       short, but
8       meaningful
9       caption.}
10   \end{center}
11 \end{figure}
```

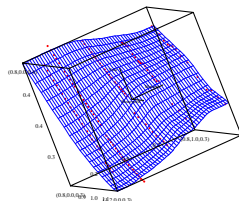


Figure 1: Include a short, but meaningful caption.

The caption is, as in tables, to be written in black and please provide any legend in the caption and not in the graph itself.

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## Examples

To create an example, use the color `isegreen` and the following structure:

```
1 \color{isegreen}
2 \textbf{Example:} Example
   title
3
4 \smallskip
5 Here you can state your
   example, which may also
   include calculations.
6 \color{black}
```

**Example:** Example title

Here you can state your example,  
which may also include  
calculations.



## Subtitles

Subtitles are to be highlighted via bold text and followed by a small skip afterwards (no colon):

```
1 \textbf{Subtitle}  
2  
3 \smallskip  
4 Here you can state the  
   content according to  
   the subtitle.
```

### **Subtitle**

Here you can state the content according to the subtitle.

This may also be applied to state proofs, theorems etc.

Short Title - please modify the figure in the lower right corner: —



## Brackets

- Use the bracket sequence  $\{(a + b = c)\}$
- Conventional bracket rules represent an exemption of this rule.  
For example:

$$Y \sim N(\mu(X), \sigma(X))$$

- Let  $\text{\LaTeX}$  take care about the correct size by preceding the bracket by `\left` and `\right`.



## Rules to write nice slides

- Use `\section{}` and `\subsection{}` to structure your presentation. The section will appear in the upper right corner of your slides.
- You can set up hyperlinks via `\label{LINKNAME}` (reference point) and `\ref{LINKNAME}` (reference).
- Remember
  - ▶ 6-8 lines per slide
  - ▶ 8 words per line



- The numbering of any enumeration should match the colour of the corresponding text (preset colour: black). Modifications may be made through the *itemize* environment:

`\item[\color{isegreen}1.]`

Itemize items are predefined (blue) and excluded from this rule.

- Use `\top` to write the symbol of transpose, it produces

$$x^{\top}y$$

- Use `\ldots` to write the symbol for three dots, it produces

$$x \in \{1, \dots, n\}$$



- The commands `\widehat{}` and `\widetilde{}` for a hat or a tilde are to be preferred over the the smaller `\hat` respectively `\tilde` commands:

$$\begin{array}{c} \widehat{Y} \text{ vs. } \hat{Y} \\ \widetilde{Y} \text{ vs. } \tilde{Y} \end{array}$$

- The norm is to be written via `\|`. It produces  $\|K\|$
- The  $\mathcal{O}$  and  $\mathcal{O}$  for convergence may be written via `\mathcal{O}` and `\mbox{\scriptsize $\mathcal{O}$}`.
- The operator for exponential terms with Euler's  $e$  as the base is defined by `\exp`:

$$\exp(1) \approx 2.718282$$





- Use `\stackrel{\mathcal{L}}{\rightarrow}` to write the symbol for convergence in distribution and denote the normal distribution by `\operatorname{N}`, this produces

$$X \stackrel{\mathcal{L}}{\rightarrow} \operatorname{N}(0, \sigma^2)$$

- Use `\operatorname{P}` to write the symbol for probability, it produces

$$P(X = x) = \frac{\exp(-\lambda)\lambda^x}{x!}$$

- Use `\stackrel{\operatorname{as.}}{\sim}` to write the symbol for asymptotic distribution, it produces

$$X \stackrel{\operatorname{as.}}{\sim} \chi^2$$



- Use command `\stackrel{\operatorname{def}}{=}` to write the symbol for definition, it produces

$$X \stackrel{\text{def}}{=} \frac{a}{b}$$

- Use commands `\Re` or `\Im` to write the symbols for the real or imaginary part, it produces

$$X = \Re\{Y\}, Y = \Im\{Z\}$$

- To write the symbols for the minimizing argument, use `\operatorname{arg}\,` `\underset{x}{\operatorname{min}}`, it produces

$$a = \arg \underset{x}{\min}\{f(x)\}$$



- Use `\operatorname{\mathbf{I}}` for the indicator function:

$$\mathbf{I}\{x < 1\}$$

- Use `\ln` or `\log` to write the symbols for natural logarithm or decimal logarithm, it produces

$$1 = \ln(\exp(1)), \quad 1 = \log(10)$$

- Use `\operatorname{E}` to write the symbol for expectation, it produces

$$\operatorname{E}[X] = \mu$$



## Using listings for source

Slides containing a listing also need [containsverbatim] as option.  
For 'highlighting' of XploRe keywords see `listing.tex`.

```
1 library("metrics")
2 randomize(10178)
3 z=(uniform(n).>0.5)~(normal(n).<0.5)
```



## Piecewise Uncovering I

The following example uses  $\langle 1 - 2 \rangle$  commands to piecewise hide and uncover text.  $\langle 1 - 2 \rangle$  makes the first item appear only on slides 1 and 2,  $\langle 2 - \rangle$  has the second item visible from slide 2 onwards.

- Itemize environments

(i) First Roman point.

Short Title - please modify the figure in the lower right corner:



## Piecewise Uncovering I

The following example uses  $\langle 1 - 2 \rangle$  commands to piecewise hide and uncover text.  $\langle 1 - 2 \rangle$  makes the first item appear only on slides 1 and 2,  $\langle 2 - \rangle$  has the second item visible from slide 2 onwards.

- Itemize environments
- can be uncovered or hidden

- (i) First Roman point.
- (ii) Second Roman point, uncovered on second slide.

Short Title - please modify the figure in the lower right corner:



## Piecewise Uncovering I

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- can be uncovered or hidden
- piecewise.

- (i) First Roman point.
- (ii) Second Roman point, uncovered on second slide.
- (iii) Last Roman point.

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# Piecewise Uncovering II

There is an easier way using \item < +- >

- Itemize environments

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## Piecewise Uncovering II

There is an easier way using \item < +- >

- Itemize environments
- can be uncovered or hidden

Short Title - please modify the figure in the lower right corner:



## Piecewise Uncovering II

There is an easier way using \item < +- >

- ▣ Itemize environments
- ▣ can be uncovered or hidden
- ▣ piecewise.

Short Title - please modify the figure in the lower right corner:



## Hiding text...

Text on the first slide.

Shown on all slides.

Short Title - please modify the figure in the lower right corner:



## Hiding text...

Text on the first slide.

Shown on second and third slide.

- Still shown on 2nd and 3rd slide.

Shown on all slides.

Short Title - please modify the figure in the lower right corner:



## Hiding text...

Text on the first slide.

Shown on second and third slide.

- Still shown on 2nd and 3rd slide.

- Shown on slides 3 and 5.

Shown on all slides.

Short Title - please modify the figure in the lower right corner:



## Hiding text...

Text on the first slide.

☐ Shown from slide 4 on.

Shown on all slides.

Short Title - please modify the figure in the lower right corner:



## Hiding text...

Text on the first slide.

- ☐ Shown from slide 4 on.
- ☐ Shown on slides 3 and 5.

Shown on all slides.

Short Title - please modify the figure in the lower right corner:



## Further Information

Further Information can be found in the  $\text{\LaTeX}$  version of this document, where some more details are explained and important specifications are highlighted.

Suggestions to improve the style or the explanations are welcome!

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## For Further Reading



Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl  
*The Not So Short Introduction to L<sup>A</sup>T<sub>E</sub>X2e*  
available on [www.ctan.org](http://www.ctan.org), 2008



Scott Pakin  
*The Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List*  
available on [www.ctan.org](http://www.ctan.org), 2008



Frank Mittelbach and Michel Goossens  
*The L<sup>A</sup>T<sub>E</sub>X Companion – 2nd ed.*  
Addison-Wesley, 2004



## For Further Reading



Mark Trettin and Jürgen Fenn

*An essential guide to  $\LaTeX$ 2e usage*

available on [www.ctan.org](http://www.ctan.org), 2007



Wikipedia Wiki Books

*LaTeX-Wörterbuch: InDeX*

available on [www.wikipedia.de](http://www.wikipedia.de)



Till Tantau

*User Guide to the Beamer Class, Version 3.07*

available on [www.sourceforge.net](http://www.sourceforge.net), 2007

