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 $Y^{(n)} = (Y_1, \ldots, Y_n)$ usually *random*.
$\mathbb{P} = \mathscr{L}(Y^{(n)})$, 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

The `Beamer`**-Package**

- ⊡ `Beamer` is the latest package to create slides with 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:

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):

    MVAboxcity

    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}
```

$$4x + 8 = (3 - 2)^2 \qquad (1)$$
$$4x = -7$$
$$x = -\frac{7}{4} \qquad (2)$$

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.

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}
```

Figures

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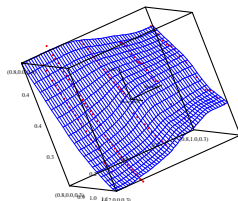

Figure 1: Include a short, but meaningful caption.

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.

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.

Brackets

- Use the bracket sequence $[\{(a + b = c)\}]$
- Conventional bracket rules represent an exemption of this rule. For example:
$$Y \sim \mathsf{N}(\mu(X), \sigma(X))$$
- Let 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).
- ⊡ Use, if necessary, \displaystyle to force LATEXto display fractions in big font size
- ⊡ 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

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

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

$$\widehat{Y} \text{ vs. } \hat{Y}$$
$$\widetilde{Y} \text{ vs. } \tilde{Y}$$

- ⊡ 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

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

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

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

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

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

- ⊡ 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

$$a = \arg \min_{x}\{f(x)\}$$

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

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

⊡ Use \log to write the symbol for the natural logarithm, it produces

$$1 = \log\{exp(1)\}$$

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

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

- ⊡ Use
  \hyperlink{labelname}{\beamerbutton{Link Name}} to
  jump to other parts of your slides

  Link Name

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 $< 1 - 2 >$ commands to piecewise hide and uncover text. $< 1 - 2 >$ makes the first item appear only on slides 1 and 2, $< 2- >$ has the second item visible from slide 2 onwards.

- ⊡ Itemize environments

(i) First Roman point.

Piecewise Uncovering I

The following example uses $< 1 - 2 >$ commands to piecewise hide and uncover text. $< 1 - 2 >$ makes the first item appear only on slides 1 and 2, $< 2- >$ 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.

Piecewise Uncovering I

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

- ⊡ can be uncovered or hidden
- ⊡ piecewise.

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

Piecewise Uncovering II

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

- ⊡ Itemize environments

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

Hiding text. . .

Text on the first slide.

Shown on all slides.

Hiding text. . .

Text on the first slide.
Shown on second and third slide.

- ⊡ Still shown on 2nd and 3rd slide.

Shown on all slides.

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.

Hiding text. . .

Text on the first slide.

⊡ Shown from slide 4 on.

Shown on all slides.

Hiding text...

Text on the first slide.

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

Shown on all slides.

Further Information

Further Information can be found in the 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!

For Further Reading

📄 Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl
The Not So Short Introduction to LATEX2e
available on www.ctan.org, 2008

📄 Scott Pakin
The Comprehensive LATEXSymbol List
available on www.ctan.org, 2008

📕 Frank Mittelbach and Michel Goossens
The LATEX Companion – 2nd ed.
Addison-Wesley, 2004

For Further Reading

📄 Mark Trettin and Jürgen Fenn
An essential guide to LATEX2e usage
available on www.ctan.org, 2007

📄 Wikipedia Wiki Books
LaTeX-Wörterbuch: InDeX
available on www.wikipedia.de

📄 Till Tantau
User Guide to the Beamer Class, Version 3.07
available on www.sourceforge.net, 2007