

STAT:5400 (22S:166) Computing in Statistics

More on L^AT_EX

Lecture 4
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Kate Cowles
374 SH, 335-0727
kate-cowles@uiowa.edu

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* *figure* environment makes graph “floating” and enables adding caption

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Including PDF graphics files in a L^AT_EX file

- include in the preamble

```
\usepackage{graphics}
```

- include in the body of the document

```
\begin{figure}[ <h,t,b, or p> ]  
  \begin{center}  
    \scalebox{ <size> }{\includegraphics{ <filename.pdf> }}  
  \end{center}  
  \caption{ <caption> }  
\end{figure}
```

- letters h, t, b, and p mean the same as in table
- **<size>** in **scalebox** command means what multiple of size of original figure to use (e.g. 0.5 for half)
- graphics do not have to be put in *figure* environment

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Adding a bibliography using BibT_EX

- associated product that can be used with L^AT_EX to prepare bibliographies
- enables you to keep all your references in a database
- extracts only those that are cited in a particular paper
- different style files available to format the bibliographic entries and citations in different standard ways
- <http://amath.colorado.edu/documentation/LaTeX/reference/faq/bibstyles.html#bibfile>
- to use reference formats that are standard in statistics publications, include in your preamble

```
\usepackage{natbib}
```

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BibT_EX continued

- example .bib file

```
@Article{Cow96,
  author = {Mary Kathryn Cowles},
  title = {Accelerating {M}arkov chain {M}onte {C}arlo
    for cumulative-link generalized linear models},
  journal = {Statistics and Computing},
  year = {1996},
  volume = {6},
  number = {},
  month = {},
  pages = {101-111},
  note = {},
  annote = {}
}
```

- inserting the bibliography at the end of the article (**apalike** style together with **natbib** package formats the references as desired)

```
\bibliographystyle{apalike}
\bibliography{lectref.bib}
```

- citing references in the body of the text

```
Blocking may solve the problem of slow convergence
in a Gibbs sampler for a cumulative link GLM as shown
in~\citet{Cow96}.
```

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Blocking may solve the problem of slow convergence in a Gibbs sampler for a cumulative link GLM as shown in ?.

```
Blocking may solve the problem of slow convergence
in a Gibbs sampler for a cumulative link GLM
~\citep{Cow96}.
```

Blocking may solve the problem of slow convergence in a Gibbs sampler for a cumulative link GLM (?).

- be sure the style file you referenced in **bibliographystyle** is where L^AT_EX can find it (e.g. in the subdirectory the .tex file is in). This is NOT necessary with standard style files (such as **apalike** that are installed by the system administrators).

Compiling a L^AT_EX file with BibT_EX

- **pdflatex** to create .aux file

```
pdflatex <filename>
```

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- **bibtex** to start matching references in .bib file to start matching references in .bib file

```
bibtex <filename>
```

- 3 more steps to finish process!

```
pdflatex <filename>
bibtex <filename>
pdflatex <filename>
```

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Some math in L^AT_EX

- Greek letters

```

 $\theta$ ,  $\Theta$ ,  $\omega$ , and  $\Omega$ 

```

θ , Θ , ω , and Ω

```

 $\mbox{\boldmath $\theta$}$ 

```

θ

- aligned equations

```

\begin{eqnarray}
{\bf y} & \sim N \left( {\bf X} \mbox{\boldmath $\beta$}, \right. \\
& \left. \mbox{\boldmath $\Sigma$} \right) \nonumber \\
\mbox{\boldmath $\Sigma$} & = & \\
\left[ \begin{array}{cc} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{array} \right] & & \\
\end{eqnarray}

```

$$\begin{aligned}
 \mathbf{y} &\sim N(\mathbf{X}\boldsymbol{\beta}, \boldsymbol{\Sigma}) \\
 \boldsymbol{\Sigma} &= \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{bmatrix} \quad (1)
 \end{aligned}$$

- special symbols

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```
\begin{eqnarray*} % asterisk suppresses numbering  
y & = & \sqrt{\frac{q}{r}} \\ i & = & 1, \dots, n  
\end{eqnarray*}
```

$$y = \sqrt{\frac{q}{r}}$$
$$i = 1, \dots, n$$

References

Cowles, M. K. (1996). Accelerating Markov chain Monte Carlo convergence for cumulative-link generalized linear models. *Statistics and Computing*, 6:101–111.