22S:166
Computing in Statistics

More on LaTeX

Lecture 4
Sept. 7, 2007

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Including graphics files in a LaTeX file

- include in the preamble

```
\usepackage[dvips]{graphics}
```

- include in the body of the document

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

* *figure* environment makes graph "floating" and enables adding caption

Adding a bibliography

- built-in bibliographic capabilities in LaTeX enable matching references in the body of the text to entries in the bibliography
- creating the bibliography at the end of the article

```
\begin{thebibliography}{9}   % 9 if < 10 items in biblio;
                             % 99 if 10 - 99, etc.
    \bibitem{ Cow96 }
        Cowles, M.K. (1996).
        Accelerating Markov chain Monte Carlo convergence
        for cumulative-link generalized linear models.
        {\em Statistics and Computing}, {\bf 6}, 101--111.
\end{thebibliography}
```

- 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~\cite{Cow96}.
```

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

- you must put entries in bibliography in order you want them to be listed

BibTeX

- associated product that can be used with LaTeX to prepare bibliographics
- 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

Some math in LaTeX

- Greek letters

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

θ, Θ, ω, and Ω

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

$\mbox{\boldmath θ}$

- aligned equations

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

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

- special symbols


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

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

Bibliography

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