

## 22S:166 Computing in Statistics

### More on L<sup>A</sup>T<sub>E</sub>X

Lecture 4  
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\* *figure* environment makes graph “floating” and enables adding caption

## Including graphics files in a L<sup>A</sup>T<sub>E</sub>X 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

## Adding a bibliography

- built-in bibliographic capabilities in L<sup>A</sup>T<sub>E</sub>X 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 [1].

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

## BibTeX

- associated product that can be used with L<sup>A</sup>T<sub>E</sub>X 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

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

$$y = \sqrt{\frac{q}{r}}$$

$$i = 1, \dots, n$$

## Some math in L<sup>A</sup>T<sub>E</sub>X

- Greek letters

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

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

`\mbox{\boldmath \theta}`

**$\theta$**

- aligned equations

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

$$\mathbf{y} \sim N(\mathbf{X}\boldsymbol{\beta}, \boldsymbol{\Sigma})$$

$$\boldsymbol{\Sigma} = \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{bmatrix} \quad (1)$$

- special symbols

## Bibliography

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