LaTeX advanced

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DCC/UFMG

September 25, 2012

Fancier tables

Overall Grade	Name	Grades								Mean
		Lists			Assignments			Tests		
		1	2	3	1	2	3	1	2	
B	Chapolim Colorado	10	10	10	5	10	10	10	5	8.75
	Xulambs Xulumbs	5	10	10	10	5	5	10	10	8.125
D	Cicrano Deltrano	8	8	3	3	8	8	8	8	6.75
	Zero A. Esquerda	7	7	1	6	2	2	10	10	6.875
E	Mutatis Mutantis	5	5	5	10	10	1	2	2	5.0

This page requires packages `multicol`, `multirow`, `colortbl`.

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```
\begin{tabular}{c|c|ccc|ccc|cc|r@{.}l}
\textbf{Overall} &
\multirow{3}{*}{\textbf{Name}} &
\multicolumn{8}{c|}{\textbf{Grades}} &
\multicolumn{2}{c}{} \\
```

Trick to align floats

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Header split on rows 1 and 2

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"Name" column header

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Number of rows to span

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Row width, * means "best fit"

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"Grades" column header

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Alignment and vertical line

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```

Preventing LATEX from printing a dot

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```
E & Mutatis Mutantis &
\cellcolor{gray}5 & \cellcolor{gray}5 &
\cellcolor{gray}5 & 10 & 10 &
\cellcolor{gray}1 & \cellcolor{gray}2 &
\cellcolor{gray}2 & 5 & 0 \\
```

Defining colors

```
\definecolor{LightCyan}{rgb}{0.88,1,1}
```

Math fonts and spacing

Math and roman text

- ▶ Math text is $different$ from italics: *different*
- ▶ Put text in math mode inside \mathrm{}
    - ▶ Compare E_{SVM} and E_SVM
    - ▶ E_{SVM} vs. E_SVM
- ▶ We can remove some horizontal space in formulas with \!
    - ▶ For example, $di\!f\!\!f$ gives $diff$
    - ▶ May help when LaTeX screws up

Multiline equations and matrices

$\backslash$begin{array} is similar to the `tabular` environment

Input

```
\begin{equation*}
\chi(\lambda) = \left| \begin{array}{ccc}
\lambda - a & -b & -c \\
-d & \lambda - e & -f \\
-g & -h & \lambda - i \end{array}\right|
\end{equation*}
```

Output

$$\chi(\lambda) = \left| \begin{array}{ccc} \lambda - a & -b & -c \\ -d & \lambda - e & -f \\ -g & -h & \lambda - i \end{array}\right|$$

Multiline equations and matrices

$\backslash$begin$\{$array$\}$ is similar to the `tabular` environment

Input

```
\begin{equation*}
|x| = \left\{ \begin{array}{ll}
x & \mbox{if $x \geq 0$};\\
-x & \mbox{if $x < 0$}.\end{array}\right.
\end{equation*}
```

Output

$$|x| = \left\{ \begin{array}{ll} x & \text{if } x \geq 0; \\ -x & \text{if } x < 0. \end{array}\right.$$

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Output

$$|x| = \left\{ \begin{array}{ll} x & \text{if } x \geq 0; \\ -x & \text{if } x < 0. \end{array} \right.$$

Open the left brace

Multiline equations and matrices

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\end{equation*}
```

Output

$$|x| = \left\{ \begin{array}{ll} x & \text{if } x \geq 0; \\ -x & \text{if } x < 0. \end{array} \right.$$

Close the left brace without printing anything

Multiline equations and matrices

Use \begin{align} to write multiple, aligned equations

Input

```
\begin{align}
a^\prime &= 0\
x^\prime &= 1\
x^{2\prime}&= 2x
\end{align}
```

Output

$$a' = 0 \tag{1}$$
$$x' = 1 \tag{2}$$
$$x^{2\prime} = 2x \tag{3}$$

Defining commands

`\newcommand{name}[nparams]{commands}`

- Parameters are accessed by #1, #2, etc.

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Define macros so they appear consistently in the text

- `\newcommand{\figstr}{Fig.}`
- `\newcommand{\thesys}{\textsc{TheSystem}}`
- A single place to change, if required

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Define macros so they appear consistently in the text

- ▶ \newcommand{\figstr}{Fig.}
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Writing notes in the text

- ▶ \newcommand{\italo}[1]{{\color{blue}[ic: #1]}}
- ▶ Easy to hide

Including files

LATEX allows breaking files and joining them together

- ▶ Use \input{file} to include file.tex
- ▶ \input{} does a verbatim inclusion
- ▶ \include{} is similar, but starts the file on a new page

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Break articles in different files

- ▶ One file per section, maybe more
- ▶ Allows multiple people editing the text at once
    - ▶ Handy close to deadlines

(Negative) Spacing

We usually have an X-page article that must fit in $X - 1$ pages

How?

(Negative) Spacing

We usually have an X-page article that must fit in $X - 1$ pages

How?

\vspace{} controls vertical spaces
- Positive parameters add vertical space, and vice-versa
- Remove vertical space and help text fit

The best way to make your paper fit is by editing and polishing it

Disclaimer

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- Really; edit and polish your text until it fits

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- ▶ Low-hanging fruit: remove widows

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Squeezing text is OK *only* if the reviewers do not catch it

- ▶ Some conferences use automated format checkers that may detect negative \vspace
- ▶ Do not exagerate

Don't get your paper auto-rejected

Hi, your paper looks really neat but I am afraid it did not pass our format checking. We manually inspected it and here is a report from an expert.

#214: slightly short columns (8.9in versus the allowed 9.25in), but the leading is dense at 11.2pt. so even though the columns are slightly short, the paper has about 58 lines/column or about 3 lines extra/column. for 28 columns across 14 pages, that's 84 extra lines, or about 1.5 extra columns. (what's odd is that it looks like they took the shortcut of squishing leading instead of using all space across all pages – e.g., the bottom of page 6.)

So we must reject your paper to be fair to all the other authors who stayed in the space limits. A quick rejection allows you to go ahead and submit to other conferences. Best wishes!

Use at your own risk

Things usually caught and looked after

- ▸ Changing the margins
- ▸ Decreasing the font size
- ▸ Changing the spacing between lines

Avoid if possible

Things frowned upon

- ▶ Tiny graphs
- ▶ Small type for references
- ▶ Too much \vspace{}

Reducing whitespace around figures

Input

```
\begin{figure*}[t]
\vspace{-5mm}
\begin{centering}
\includegraphics[width=\textwidth]{figure.eps}
\vspace{-2mm}
\caption{Caption text here.}
\label{fig:figure}
\end{centering}
\vspace{-2mm}
\end{figure*}
```

Reducing whitespace around figures

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Put figures at the top, less whitespace

Reducing whitespace around figures

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\vspace{-2mm}
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```

Push figures above the top margin a bit

Reducing whitespace around figures

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\vspace{-2mm}
\end{figure*}
```

Put caption closer to graph

Reducing whitespace around figures

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\label{fig:figure}
\end{centering}
\vspace{-2mm}
\end{figure*}
```

Bring text closer to caption

Reducing whitespace around figures

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\end{centering}
\vspace{-2mm}
\end{figure*}
```

Respect proportions! Make it seem natural

Reducing whitespace around figures

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\caption{Caption text here.}
\label{fig:figure}
\end{centering}
\vspace{-2mm}
\end{figure*}
```

Same thing for tables

Reducing whitespace around section headings

Input

```
\vspace{-1mm}
\section{Section Title}
\vspace{-2mm}
```

- ▶ Cannot save much here
- ▶ Same thing for equations

Reducing size of references

Input

```
\begin{small}
\bibliographystyle{plain}
\bibliography{references}
\end{small}
```

Reducing size of references

Input

```
\begin{small}
\bibliographystyle{plain}
\bibliography{references}
\end{small}
```

- ▶ Check the references to save a few lines
  - ▶ Remove month, location, and abbreviate first names
  - ▶ It's not nice to use *"et al."* for papers with many authors

Other LaTeX tips

A few LaTeX rules to keep in mind

- ▶ LaTeX does not leave section headings before page breaks
  - ▶ Headings must be followed by two lines of text, otherwise it is pushed to the next page
- ▶ LaTeX hates leaving the first or last line of a paragraph alone
- ▶ LaTeX limits the fraction of a page that can be figures

Snowball effect

- ▶ Saving one line early can cascade to many lines at the end
- ▶ Start adding \vspace from beginning to end
- ▶ Almost useless to add \vspace before text is finished