

Advanced Use of L^AT_EX

Stan Zachary

Heriot-Watt University

15 October 2008

Outline

Resources and documentation

Software

\LaTeX to PDF

Graphics

Mathematics

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- ▶ Editor-previewer packages
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- ▶ Doesn't work very well with **Beamer**

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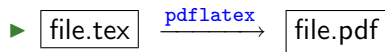
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- ▶ **Internal links** made automatically (using `\label` and `\ref`)
- ▶ Make **external links** with, e.g.

```
\href{http://www.hw.ac.uk}{Heriot-Watt University}
```

This produces a link to **Heriot-Watt University**

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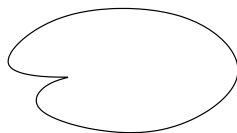
- ▶ The figure `myfig.pdf` is then included in the appropriate place in the body of the document with

```
\begin{center}
```

```
\includegraphics{myfig}
```

```
\end{center}
```

(note that the extension may in general be omitted). This gives



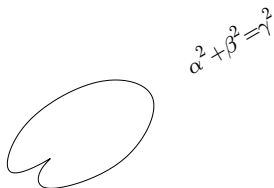
$$\alpha^2 + \beta^2 = \gamma^2$$

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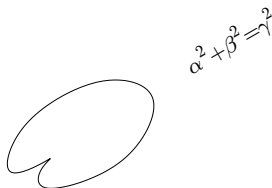


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- ▶ The above code may be included within a **figure** environment for numbering, captioning and floating placement.

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- ▶ Details of how to do it, and also a workaround script (which directly converts **.fig** files to **.eps** and **.pdf** files) are at <http://www.ma.hw.ac.uk/~stan/computing/xfiglatexnotes.txt>

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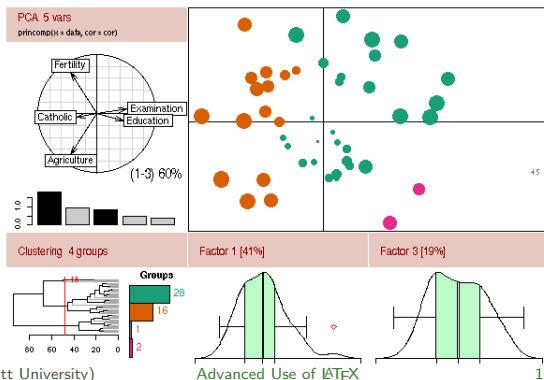
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- ▶ `eucal`: more readable calligraphic letters: $\mathcal{A}, \mathcal{B}, \mathcal{C}, \mathcal{D}, \dots$

amsmath: align align*



```
\begin{align}
x^2 + y^2 &= z^2 \nonumber \\
x^3 + y^3 &< z^3 \\
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- ▶ Variant `alignat` allows user-specification of horizontal spacing

amsmath: multline multiline*



```

\begin{multline}
  \lim_{x \to \infty} \frac{P(M > x)}{\overline{F^s}(x)} \leq \limsup_{x \to \infty}
  \frac{P(M > x, S_{\tau_1} > x - R + a - \epsilon)}{\overline{F^s}(x)} \\
  + \gamma
  \left( \frac{2 - \gamma}{(a - \epsilon)(1 - \gamma)^2} \right)
\end{multline}

```

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 + \gamma \left(\frac{2 - \gamma}{(a - \epsilon)(1 - \gamma)^2} \right) \quad (2)
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- ▶ `split` split a single equation with alignment

```

\begin{equation}
  \begin{split}
    (a + b)^3 &= (a + b)(a + b)^2 && \\
              &= (a + b)(a^2 + 2ab + b^2) && \\
              &= a^3 + 3a^2b + 3ab^2 + b^3
  \end{split}
\end{equation}

```

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 \end{aligned} \tag{3}$$

amsmath: further display environments for maths

- ▶ the `cases` environment

```

\begin{equation*}
I_A =
\begin{cases}
1 & \text{if } x \in A \\
0 & \text{otherwise}
\end{cases}
\end{equation*}

```

$$I_A = \begin{cases} 1 & \text{if } x \in A \\ 0 & \text{otherwise} \end{cases}$$

amsmath: matrix environments

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$$\begin{matrix} 0 & 1 \\ 1 & 0 \end{matrix}$$

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$$\left\| \begin{matrix} 0 & 1 \\ 1 & 0 \end{matrix} \right\|$$

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- many more commands to produce every conceivable mathematical notation and layout
- commands for fine control of equation numbering, size and placement of symbols, etc.