

MPS115/116 Presentation Lecture 5: Common LaTeX Let-Downs and Grammatical Grumbles

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We are looking at more detailed issues with LaTeX and writing. You will be starting your first mini-project next week. You will also be (anonymously) critiquing each others write-ups.

1 Environments

Markup and environments

There are three basic ways to ‘mark up’ text in LaTeX.

- By putting it inside `$.$.` or `\[..\]`.
- By putting it inside `{.}` following a command, e.g. `\emph{hello}` or `\section{Introduction}`.
- By putting it inside an environment,

```
\begin{itemize}
  \item One thing.
  \item Another thing.
\end{itemize}
```

Environments begin with `\begin{.}` and end with `\end{.}`.

I indent environments with four spaces to make my file more readable.

2 Seven common LaTeX let-downs

LaTeX let-downs

1. Maths not in maths-mode.
2. Text in maths-mode.

3. Using the wrong dash.
4. Punctuation in the wrong place.
5. Using too much displayed mathematics.
6. Using bold text.
7. Overful hboxes.

1. Maths not in math-mode

When using inline maths, it is easy to forget the single dollars.

Look out for maths symbols not displayed in italics.

Examples. This x is correct, whereas this x is not. This $f(x)$ is wrong as well, as is this set A , which is should be A .

2. Text in math-mode

The reverse situation is using text in math-mode.

This is easy to spot, as the text becomes italic and spacing isn't correct.

Examples.

This text is in math – mode

This line is also in math – mode with ~ used for spaces

The first case here may have happened by accident.

The second is someone fiddling to make things look okay, but looks bad.

2. Text in math-mode II

Text is occasionally needed within math-mode.

If it is necessary, use the `\text{...}` command (from `amsmath`).

The `\text` command allows us to write

$$x = u + v \quad \text{and} \quad y = u - v.$$

Notice the spacing between the maths and text. This has been done using the `\quad` command, which creates a large space:

```
\[
  x = u + v
  \quad\text{and}\quad
  y = u - v.
\]
```

3. Using the wrong dash

In typography there are at least four(!) kinds of dash.

name	LaTeX			
hyphen	-	-	quick-witted	<code>quick-witted</code>
minus sign	–	<code>\$-\$</code>	$3 - 4 = -1$	<code>\$3 - 4 = -1\$</code>
en-dash	–	--	30–40 people	<code>30--40 people</code>
em-dash	—	---		

For numerical ranges you use an en-dash not a hyphen.

The “en” and “em” refer to the width of the letters “N” and “M”.

In British English, for parenthetical asides – like this – the en-dash is used.

However, in American English, typically—in this way—the em-dash is used.

4. Punctuation in the wrong place

Punctuation needs to be outside of inline mathematics.

Correct Therefore `$x=2$`. The result is proved.

Wrong Therefore `$x=2.$` The result is proved.

These display as follows.

Correct Therefore $x = 2$. The result is proved.

Wrong Therefore $x = 2$. The result is proved.

There are two things wrong here.

- The spacing is wrong for the end of a sentence.
- The wrong type of dot is used.

These subtle differences will make your document look worse.

4. Punctuation in the wrong place II

Conversely, punctuation needs to be *inside* of displayed mathematics!

Otherwise it can fall to the next line.

```
Thus,
\[
\sin^2 x + \cos^2 x = 1
\],
```

and the result follows.

gives rise to

Thus,

$$\sin^2 x + \cos^2 x = 1$$

, and the result follows.

This clearly looks poor.

5. Using too much displayed mathematics I

Beginners to LaTeX often overuse displayed mathematics. Displayed mathematics should be used for important steps that you would like to stand out, or for formulas and equations too big to display well in-line. Too much displayed maths slows the reader down.

Here's an example of something broken up too much by display-math.

5. Using too much displayed mathematics II

Example. Suppose not, and $\sqrt{2}$ is rational. Then, by Lemma 1.2,

$$\sqrt{2} = \frac{a}{b},$$

where a and b share no common factors. Thus, squaring, we get

$$2b^2 = a^2.$$

It follows that a^2 is even, and hence so is a . Write

$$a = 2m$$

for some $m \in \mathbb{Z} \dots$

5. Using too much displayed mathematics III

Example (Re-write). Suppose not, and $\sqrt{2}$ is rational. Then, by Lemma 1.2, $\sqrt{2} = \frac{a}{b}$, where a and b share no common factors. Thus, squaring, we get $2b^2 = a^2$. It follows that a^2 is even, and hence so is a . Write $a = 2m$ for some $m \in \mathbb{Z} \dots$

6. Using bold text

As we know, LaTeX is a mark-up language. The best approach is to use LaTeX to tell the computer what kind of thing your text is, rather than specifically how to display it. The choice of bold or italic for emphasized text should be left to LaTeX. This ensures consistency and stops mixing **bold** and *italics*. For *emphasized* text you should use the `\emph{...}` command.

LaTeX creates documents with fully-justified text (i.e., text stretched from the left margin to the right). Usually LaTeX does this well, and doesn't like to stretch the space between the words too much. Sometimes it chooses to spill over the right margin slightly. If this happens, you will get a warning about an 'overfull hbox'. An *hbox* is a horizontal box of text.

To fix this, slightly reword the sentence; usually LaTeX finds a better way to split the lines. If the overfull hbox is very slight, you might choose to ignore it.

3 Two grammatical grumbles

Grammatical grumbles

1. Using too many paragraphs.
2. Not writing in full sentences.

1. Using too many paragraphs

Example (Bad). Let $y = e^x \cos x$.

Differentiating, we find $\frac{dy}{dx} = e^x(\cos x - \sin x)$.

Thus, $\frac{dy}{dx} = 0$ if and only if $e^x(\cos x - \sin x) = 0$.

Since $e^x > 0$ for all x , it follows that...

Example (Better). Let $y = e^x \cos x$. Differentiating, we find $\frac{dy}{dx} = e^x(\cos x - \sin x)$. Thus, $\frac{dy}{dx} = 0$ if and only if $e^x(\cos x - \sin x) = 0$. Since $e^x > 0$ for all x , it follows that...

2. Not writing in full sentences

Mathematicians often try to save time when writing by hand, adding little notes, and these might not be written in full sentences.

When typing mathematics you should write *everything* in full sentences.

Example (Bad). If $y = \sin(x) \cos(x)$ then $y' = \cos^2(x) - \sin^2(x)$ (product rule). Sub in $x = \theta/2$. Then...

Example (Better). If $y = \sin(x) \cos(x)$ then use the product rule to obtain $y' = \cos^2(x) - \sin^2(x)$. Substitute in $x = \theta/2$. Then...

4 Activity time

Activity (More proof-reading). The circulated document, available on the course website, has a number of problems with it. Find as many ways of improving the document as you can.

5 Next week

First mini-project to launch next week

Make sure you attend the Week 6 lectures next week, as the first mini-project will be launched then (to be submitted in Week 8).

6 The lab this week

About Computer Lab 5

In Computer Lab 5 we'll look at referencing and tables and a few other things.