

T_EX Tricks for the Mathematician

Helmer Aslaksen
Department of Mathematics
National University of Singapore
Singapore 117543
Singapore

aslaksen@math.nus.edu.sg
www.math.nus.edu.sg/aslaksen/

1 Introduction

T_EX has changed the face of mathematical typesetting. Most books and articles are produced using the author's T_EX file. Is this a step forward? An expert T_EXnician can produce output of the highest standard, but the average T_EX author/typist fails miserably when compared to professional typesetting. The purpose of this article is to point out some common errors.

2 Math tricks

Set operator names in roman. Math italics uses special spacing as in *Spin*(*n*). As a general rule, *every* mathematical term with more than one letter should be set in roman. So please write `Spin`(*n*), using `\operatorname{Spin}`(*n*) or define a new command in the preamble. If you use the `amsmath` package you can use `\DeclareMathOperator{\Spin}{Spin}`.

Scale the delimiters. Use `\left\{` to get

$$S = \left\{ \begin{pmatrix} \pm 1 & 0 \\ 0 & \pm 1 \end{pmatrix} \right\} \quad \text{instead of} \quad S = \left\{ \begin{pmatrix} \pm 1 & 0 \\ 0 & \pm 1 \end{pmatrix} \right\}.$$

I also find that a `\bigl` makes `[[X, Y], Z]` easier to read than `[[X, Y], Z]`.

Use / more often. Always write a/b in text. Big fractions like $\frac{a}{b}$ can mess up a whole paragraph. This also raises another issue. You should understand the difference between display style and text style. \TeX has a tendency to use text style when I feel display style would be better. I prefer

$$f(x) = \frac{g(x)}{h(x)} \quad \text{to} \quad f(x) = \frac{g(x)}{h(x)}.$$

Use the right kind of dots. This is slightly controversial. Everybody I know writes $1, \dots, n$ and $x_1 \cdots x_n$, but Knuth ([1, p. 172]) wants $x_1 \dots x_n$. Anyway, don't write

$$x_1 + \dots + x_n,$$

but use `\ldots` or if you use the `amsmath` package, just `\dots`.

Should you break before or after +’s? The rule is simple ([1, p. 195]): you break *after* binary operators in text and *before* binary relations in displays. And when you break before a $+$, remember to write `{ }+x`, so \TeX knows that the $+$ is a binary operator ([1, p. 196]).

Don't use symbols for visual effects. Don't write $\langle x, y \rangle$ to denote an inner product. Use the so-called angle brackets, `\langle x, y \rangle`, to get $\langle x, y \rangle$. And remember to write `\langle , \rangle` (`\langle \, , \rangle`) and not `\langle , \rangle` (`\langle \, \rangle`).

Don't confuse `|` and `\mid`. Notice the difference between

$$\{|f(x)|x \in D\}, \quad \{|f(x)| \mid x \in D\} \quad \text{and} \quad \{|f(x)| \big| x \in D\}.$$

In the first I just used `|`, in the second I used `\mid` and in the last I used `\bigm|`. In the last I also used `\left\{\,` to bet more space and bigger braces.

Colons in function maps are different than text colons. Use `f\colon X \to Y` ($f: X \rightarrow Y$) not `f: X \to Y` ($f : X \rightarrow Y$).

I think that \tilde{S} looks too wimpy. Beef it up with a `\widetilde` to get \widetilde{S} .

Avoid unnecessary space around displayed math. If you leave an empty line before and after your displayed math, you will get unnecessary space both before and after and an unnecessary indent after.

Read the masters. Read Chapter 18 of the \TeX book ([1]) and Chapter 8 of the \LaTeX Companion ([3]).

3 Text tricks

Use the right quotes. Don't say "this" ("this")! It should be “that” (‘‘that’’)! Notice how " will always give the wrong result on the left. When using Computer Modern fonts, " gives the right result on the right, but it may not work for other fonts.

Get your bibliography right. Don't write *Notices Amer. Math. Soc.*, write *Notices Amer. Math. Soc.* (Use `._` to get proper spacing.) And write pp. 1–40 instead of pp. 1-40 (remember to use `--`, see p. 4).

References

- [1] Donald E. Knuth, *Computers & Typesetting, Volume A: The T_EXbook*, Addison-Wesley, 1984.
- [2] Leslie Lamport, *L^AT_EX: A Document Preparation System, User's Guide and Reference Manual*, Second Edition, Addison-Wesley, 1994.
- [3] Frank Mittelbach and Michel Goossens with Johannes Braams, David Carlisle, and Chris Rowley, *The L^AT_EX Companion*, Second Edition, Addison-Wesley, 2004.