Directions for PME Journal authors

LaTeX

By far and away the most common method of typesetting professional mathematical text is using some flavor of Donald Knuth's TeX. The ΠME Journal requires submissions to be in LaTeX. The LaTeX system is more complicated than a word processing system, however anyone who writes mathematics will find it worthwhile to learn LaTeX.

There is a large repository of information on LaTeX at the CTAN archive `http: ctan.tug.org`, as well as links to freeware, shareware and commercial implementations of LaTeX.

Please note the LaTeX implementation you choose must let you input the LaTeX commands directly. The output of LaTeX converting programs is useless, and cannot be accepted. We will also not except files produced by the **Scientific Word** program, or WYSIWYG editors which automatically generate LaTeXoutput.

THE IDEA OF LaTeX.

Many authors get off on the wrong foot with LaTeX by regarding it as a bizarre word processing system and trying to get it to typeset their document as they wish to see it. LaTeX can be used that way, but often with a great waste of time and resources. (Ordinary TeX is better for such a job.) LaTeX is a typesetting program. Your main job as an author is to tell LaTeX the information it needs to typeset the document for you. It needs to know not just the text itself, but the role the text plays in your article, e.g. if the text is part of a theorem, or proof, or an equation, or a list, or section title, etc. LaTeX then typesets your document according to the the dictates of the "stylefiles" selected when it is run. Each journal has its own style files, depending on what choices the editors have made, so that the journal has a consistent typographical "look".

For example, there are many ways to indicate the end of a proof. You may have noticed that some people write QED and some people prefer a little box, but actually there are hundreds of choices. You can have QED, qed, q.e.d., *qed*, QED., etc. And there are lots of different little boxes, too. Should it go right after the period? Should it be centered on the line? Should there be a space? How much space? Every journal does it a little differently and you as an author ought not to have to worry about it. What you do in LaTeX is end the proof with the command `\end{proof}`, and then whichever journal you send the document to can process the command in its own way.

If this were an ideal system, then the author would not have to worry about the looks of the article at all, and could leave that to the typesetting program to decide. Actually you do have to take some care because LaTeX may not be intelligent enough to handle some delicate or unexpected situations. Even then, however, the name of the game is to try to make the output as consistent as possible with the *intention* of the style files.

For example, if you are having trouble because you want to end your proofs with QED and LaTeX insists on putting a little box, (or vice versa) then you are only working to undo the work of the editor. Stop it. Go with the flow. If, on the other

hand, a displayed equation is so huge that it sticks out over the margin ...

$$T(k) = \tan\left(3 + \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right) + \left(4 - \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right)^{\frac{1}{1+\sqrt{1+\frac{1}{k^2}}}} + \left(5 - \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right)^{6 + \frac{1}{1+\sqrt{1+\frac{1}{k^2}}}}$$

then you ought to rethink how to display that equation. Just putting the equation in tiny type

$$T(k) = \tan\left(3 + \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right) + \left(4 - \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right)^{\frac{1}{1+\sqrt{1+\frac{1}{k^2}}}} + \left(5 - \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}\right)^{6 + \frac{1}{1+\sqrt{1+\frac{1}{k^2}}}}$$

not only makes it even harder to read, but puts the equation out of style. Here you must use your mathematical skills to solve the problem, for instance you might introduce the quantity

$$d_k = \frac{1}{1 + \sqrt{1 + \frac{1}{k^2}}}$$

and write

$$T(k) = \tan\left(3 + d_k\right) + \left(4 - d_k\right)^{d_k} + \left(5 - d_k\right)^{6 + d_k}.$$

Style Files

Since the style files ΠME uses are not part of the standard LaTeX distribution, your article won't appear to you as it does in the journal. The style file you will use is called article.sty. The best thing to do is to download the sample file from the ΠME website `http://www.pme-math.org/` and use that file as a template for your document.

Fonts

Word processor users are accustomed to choosing fonts and font characteristics at will. For scientific articles, such decisions are made by the editor in the style files. In general, avoid trying to change fonts. For example use `\em` to emphasize text, not `\it`, the command to signal italics. The style file will choose how to emphasize the text depending on the situation.

One exception is the bibliography. ΠME uses small caps for authors' names, and italics for titles of journal articles. Titles of books are to be in ordinary type enclosed in quotes. Otherwise avoid font commands.

LaTeXwill choose the fonts for most mathematical text. Greek letters are not made by changing fonts but by the special commands `\alpha`, `\beta`, `\gamma`, etc. Other than the Greek letters, the most common allowed font change is to use the real number symbol, which is a capitol R in the mathbb font. To use this add `\usepackage{amssymb}` to the start document and then `{\mathbb R}` is the command for the real number symbol. This is already prepared in the pmesample.tex file.

Spacing Commands

The LaTeX system has many commands for adding horizontal and vertical space, breaking lines and starting new pages. These commands are not for the authors. Do not use them to trick the typesetter. Many authors want to skip lines, for instance between paragraphs or after equations, or to have unindented paragraphs,

or break lines after an inline equation. Don't do this. Either the author or our volunteers have to remove all these commands.

Consider that even if you space your text beautifully, it will look very different when it passes through our typesetter.

A common source of this problem is that some authors wish to reproduce in their article the blackboard work of a nice lecture, or well laid out transparencies of a great talk. Usually this cannot be done in any journal. The format of a journal article is a written exposition made up of sentences and paragraphs. It is just as inappropriate to try to make the journal page look like a powerpoint slide, as it is to fill a powerpoint slide with nothing but paragraphs in small type.

CITATION AND LABELS

All references and citations should use the `\ref` and `\cite` commands. Each will require a `\label` and `\bibitem`, respectively. This will save you a lot of time in the editing process.

LARGER STRUCTURES

Use `\newtheorem` to create your theorem-like environments, Lemmas, Propositions, and the like. For lists use `\enumerate`, `\itemize` and `\description`

FIGURES

One of the most exciting things about publishing mathematics in the computer age is the ease of producing interesting, informative and professional looking figures. For the ΠME Journal you have two choices of format for figures, either the LATEX picture environment, (which is only good for small simple drawings) or encapsulated postscript, (epsf).

Most scientific programs such as Mathematica, Maple, Matlab, and vector-based drawing programs will produce epsf files. Some programs save files as bitmap images, usually with formats like jpg, bmp, gif, tif, etc. While they may may look perfect on your screen, unfortunately these files usually do not print well for line drawings, which comprise most mathematical figures, see Figure 1. Of course,

Bitmap image on your PC
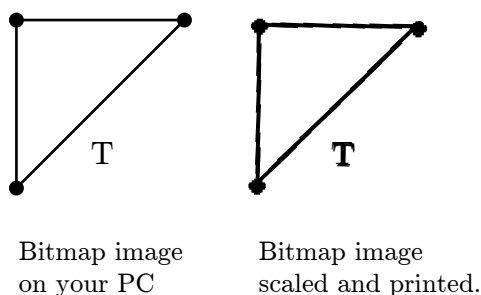
Bitmap image scaled and printed.

FIGURE 1.

programs exist to convert from bitmap formats to epsf, but such programs do not improve the printability because they cannot recover the vector data.

On unix environments fig or xfig is especially recommended for producing figures.

The journal will consider a color figure in exceptional cases.

Automatically converting a file to a LaTeX file

Suppose you have set your document in Microsoft Word, for instance, and want to convert it into LaTeX. There are programs which claim to be able to do this conversion. What they do is take your word processor's format and reproduce that format using LaTeX commands. The better these programs are, the more they have to fool the typesetter which is trying to follow the style file. The end is a LaTeX file which, when printed, looks more or less exactly the way the article should *not* look. Such a file is useless to the journal.

The only way to convert a **Microsoft Word** file into a LaTeX article is for a human being to retype it.

For the same reason, the LaTeX output of **Scientific Word** is not acceptable for submission.

What is to be submitted

(1) The LaTeX source file, i.e. the .tex file, which follows the format of the template file found at `http://www.pme-math.org/`.
(2) Encapsulated postscript files for each included figure.
(3) A hard copy

You should *not* send us .dvi, .ps, or any .bmp files. We don't need them and they are huge and clog up the mail system.

Conclusion

It may seem unfamiliar at first, but remember — anybody smart enough to write an article for a mathematics journal should not find LaTeX too hard to learn. Have fun . . .