A REALLY GREAT TITLE GOES HERE

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Abstract. After a crisp, cogent analysis of the problem, the author brilliantly cuts to the heart of the question with incisive simplifications. These soon reduce the original complex edifice to a smoldering pile of dusty rubble.

1. Introduction

This is where you put your snappy introduction. Be sure to explain to the reader why your work is so interesting and important.

When you are done with your paper be sure to add a title, a short title if necessary, an abstract, keywords, and the Mathematics Subject Classification, which you can find at `http://www.ams.org/msc/`

2. Preliminaries

I've put some macros in the preamble that you may want to keep. For example, the symbols $\mathbb{Z}$, $\mathbb{R}$, and $\mathbb{T}$. Also commands like $\operatorname{coker} T$, $\operatorname{im} T$, $\operatorname{rank} T$. You can remove the ones you don't want, or add your own.

Remember, the first time you typeset a document it will produce the output with ?'s in place of the references and citations. You need to typeset it a second time for the correct numbers to be put in. (And if you ever get to the point when you're using a Table of Contents produced by LaTeX, you need to typeset it a third time to get the page numbers in the Table of Contents to be correct.)

You can also make "quotation marks" around phrases. However, be sure to produce the opening quotes properly, or you will get something "like this", which looks tacky. You can also produce 'single quotes', although you should almost never need to do this.

Here are some examples of things you may want to do in LaTeX. For example, you can display expressions such as

$$p(x) = x^3 + x^2 + x + 1.$$

Or if you want to display two (or more) expressions on one line, you can do something like this:

$$x_\lambda \xrightarrow{w^*} x \qquad \text{and} \qquad X \mathbin{\widehat{\otimes}} Y.$$

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Key words and phrases. C^*-algebras, operator spaces, completely positive maps.

In addition to displaying one-line expressions, you can use the align* environment to produce

$$\begin{aligned} h(x) + f(x) &= \sin z + 18 \\ &= \text{more stuff goes here} \\ &= g(x) + 7^2 \\ &= \infty^{\infty}. \end{aligned}$$

Or if you want to fit a long set of equalities into a displayed format you can use the align* environment to produce something like

$$\begin{aligned} f(x) &= \sqrt{x^2+2x+1} = \sqrt{(x+1)^2} = |x+1| = \pm(x+1) \\ &= y + z + t = \pi + e = \Gamma(x) = \sin\theta + \cos\theta = a + b + c + d \\ &= 52 \end{aligned}$$

Notice that the expressions are aligned where the & symbols are. Also note that each line (except the last) ends with the carriage return symbol \\.

This command allows you to make a bunch of comments in the margin. It is handy when working with coauthors over email

It is also possible to produce expressions with cases.

$$f(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{if } x < 0. \end{cases}$$

You can write lemma and theorems, such as the following.

Lemma 2.1. *If a, then b.*

Proof. This follows from c. □

Theorem 2.2. *The zeroes of the zeta function all lie on a line.*

Proof. Wave hands here. □

Theorem 2.3. *In a right triangle $a^2 + b^2 = c^2$.*

Proof. Start with a right triangle and draw squares on each side. . . . In the end we see that $a^2 + b^2 = c^2$. □

Always be sure to use a tie when you refer to Theorem 2.3. This prevents LaTeX from putting "Theorem" on one line and "2.1" on a second line in a linebreak. When you refer to theorems from other papers, you can write Theorem 15 of [1] or you can write [1, Theorem 15]. Sometimes one works better than the other in certain sentences. In any case, be sure to use ties in these references as well.

Another use for ties: When you type a period in LaTeX it will always put two spaces after it, because this is what you want at the end of a sentence. However, sometimes you write terms like Dr. Smith or J. P. Morgan or J. R. R. Tolkien. Left alone, LaTeX will put two spaces after the period and it looks bad. If you use a tie, and write Dr. Smith or J. P. Morgan or J. R. R. Tolkien, then LaTeX will only put one space after the periods.

You can also make definitions. It's typical to have an environment for definitions that is different from lemmas, theorems, etc. (See the preamble above.) In particular, the definition environment produces roman text rather than italics.

Definition 2.4. A *triangle* is a polygon with three sides.

If you don't like the format of any of the environments (italics vs. roman) you can change it in the preamble. The way I have it listed is fairly standard, but sometimes people change it a little. (Did you notice the tie after vs.?)

It is also possible to produce footnotes.[1]

Remark 2.5. Be sure to be aware of all the various "theorem" environments, such as "theorem", "proposition", "corollary", "remark", "question", etc. Add more if you need them. In particular, the remark environment is very useful. It often helps to organize your paper better if you use the remark environment often rather than have lengthy discussions or explanations in the text. You can also refer to these Remarks more easily.

When you display an expression in the equation environment, you can label it

$$x + y = \sin\theta + \mu \tag{2.1}$$

and then reference it as (2.1). Note that if you simply write 2.1 in your code, you don't get the parentheses.

If we want to label aligned environments, we use the align environment.

$$\begin{aligned} a^2 + b^2 &= c^2 && (2.2)\\ &= \sin\theta && (2.3)\\ &= g(x) \\ &= \omega^2. && (2.4) \end{aligned}$$

We can refer to the labeled lines as (2.2), (2.3), and (2.4). Note that on a line in which we do not want a label, we write \notag in the code.

You can also use XY-pic to make commutative diagrams, and many other drawings.

$$v_0 \xrightarrow{e_1} v_1 \xrightarrow{e_2} v_2 \xrightarrow{e_3} v_3 \xrightarrow{e_4} \cdots$$

Here are some more examples of aligned equations. For an aligned display that is not numbered we have

$$\begin{aligned} \Lambda_N(s;f) &= \left(\frac{2\pi}{\sqrt{N}}\right)^{-s}\Gamma(s)L(s;f) \\ \Lambda_M(s;g) &= \left(\frac{2\pi}{\sqrt{M}}\right)^{-s}\Gamma(s)L(s;g) \end{aligned}$$

[1] This is a footnote.

A numbered version is given by

$$\Lambda_N(s;f) = \left(\frac{2\pi}{\sqrt{N}}\right)^{-s} \Gamma(s)L(s;f) \tag{2.5}$$

$$\Lambda_M(s;g) = \left(\frac{2\pi}{\sqrt{M}}\right)^{-s} \Gamma(s)L(s;g) \tag{2.6}$$

A version with only one number associated to the group of equations is given by

$$\begin{aligned} \Lambda_N(s;f) &= \left(\frac{2\pi}{\sqrt{N}}\right)^{-s} \Gamma(s)L(s;f) \\ \Lambda_M(s;g) &= \left(\frac{2\pi}{\sqrt{M}}\right)^{-s} \Gamma(s)L(s;g) \end{aligned} \tag{2.7}$$

Something with cases

$$\phi_p(s) = \begin{cases} \left(\frac{1-b(p)p^{-s}+\psi(p)p^{k-1-2s}}{1-a(p)p^{-s}+\chi(p)p^{k-1-2s}}\right) & \text{if } p \mid L \\ 1 & \text{if } p \nmid L. \end{cases}$$

In addition to sections you can also have subsections.

2.1. **A Useful Example.**

These subsections can help to organize your paper, particularly if there are a lot of distinct parts.

You can also use subsection$*$, which will not number the subsection. This is useful for acknowledgements as well as many other situations.

Acknowledgments. I would like to thank all the little people who made this work possible.

You can include linebreaks with dollar signs.

And then at the end of your paper you list your bibliography.

References

[1] T. Bates, D. Pask, I. Raeburn and W. Szymański, *The C^*-algebras of row-finite graphs*, New York J. Math. **6** (2000), 307–324.

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