

WRITING A MATHEMATICAL RESEARCH REPORT

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ABSTRACT. The abstract is a very short summary of the results in the work. It should be more illuminating than the title, but not as detailed as the introduction.

1. INTRODUCTION

Give a brief statement of the problem, including its historical context and an overview of the major developments in its history, with references [B].

Provide a guide for the reader. In Section 2 we'll discuss some particular conventions for the writing of mathematical articles. In Section 3 we'll define the problem precisely and give a proof of the main result. We conclude in Section 4 with some examples and applications.

2. MATHEMATICAL CONVENTIONS

Most mathematical journals rely on authors to electronically submit their articles in \LaTeX . The journals usually provide a *style file* which allows an author to easily recreate the “look and feel” of the particular journal. For this report, the default `amsart` documentclass will be fine.

We write math papers in first person plural, signifying “the author(s) and the reader together”. Besides being a more natural writing style than the stiff formality of “one sees that” or “in this paper it is shown that”, it tends to be a bit shorter.

Math papers don't have a conclusion, even though articles in most other disciplines do. Instead, the introduction takes up the slack. So most articles will include in the introduction:

- a discussion of the context of the work;
- a statement of the main theorem or theorems;
- a discussion of related results in the literature; and
- a “roadmap” of the paper, detailing what will be found in each section.

For a paper whose goal is to present a new theorem, for example, the main body of the paper will have minimal discussion, in general, focussing instead on presenting the results and giving the proofs. Where the introduction may be packed with several disjoint things, the rest of the paper will flow smoothly.

When a new term is introduced, use *italics* (command: `emph`), not boldface or underlining. \LaTeX has several features to help typeset definitions or theorems consistently: `theoremstyle` commands. (See the preamble of this document for one set-up.)

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Theorem 2.1. *Footnotes are rarely used. References to the literature are made as they occur [G]. They should be made as specific as possible [G, Thm3.3] if the work is a long one.*

Proof. The bibliography should be typeset and arranged as uniformly as possible. Many different ways of citing a particular work may be acceptable; the key points are to identify: the author, the title of the work, the publisher, and the year. More detail is usually needed for articles in journals, such as volume or issue number. Book and journal titles may be put in *italics*, whereas article titles are “put in quotation marks”. \square

Cross-referencing within your article can be very helpful to the reader. For example, refer to Theorem 2.1 or Equation (3.1).

3. STATEMENT OF THE PROBLEM

The most important problem in mathematics involves simplifying the expression

$$\sum_{i=1}^n i,$$

a problem famously solved by Gauss [G] at the age of six. His solution

$$(3.1) \quad \sum_{i=1}^n i = \frac{n(n+1)}{2}$$

is brilliant.

Next, we'd like to understand the n th term in a sequence x_0, x_1, x_2, \dots , where $x_i = 4i + 2$.

4. EXAMPLES

There are many wonderful applications of number theory.

REFERENCES

- [B] R. U. Brilliant, “The Quadratic Form” in *Journal of Applied Number Theory*, Vol. 3, No. 2 (1998).
- [G] C. F. Gauss, *Brilliant Math*, Princeton University Press, 2002.