

How to Effectively Write a Mathematics Research Paper

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Post Url

<https://www.enago.com/academy/effectively-write-mathematical-research-paper/>



Mathematics research papers are different from standard academic research papers in important ways, but not so different that they require an entirely separate set of guidelines. Mathematical papers rely heavily on logic and a specific type of language, including symbols and regimented notation. There are two basic structures of mathematical research papers: [formal and informal exposition](#).

Structure and Style

Formal Exposition

The author must start with an outline that develops the logical structure of the paper. Each hypothesis and deduction should flow in an orderly and linear fashion using formal definitions and notation. The author should not repeat a proof or substitute words or phrases that differ from the definitions already established within the paper. The theorem-proof format, definitions, and logic fall under this style.

Informal Exposition

Informal exposition complements the formal exposition by providing the reasoning behind the theorems and proofs. Figures, proofs, equations, and mathematical sentences do not necessarily speak for themselves within a mathematics [research](#)

[paper](#). Authors will need to demonstrate why their hypotheses and deductions are valid and how they came to prove this. Analogies and examples fall under this style.

Conventions of Mathematics

Clarity is essential for writing an effective mathematics research paper. This means adhering to strong rules of logic, clear definitions, theorems and equations that are physically set apart from the surrounding text, and using math symbols and notation following the conventions of mathematical language. Each area incorporates detailed guidelines to assist the authors.

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Logic

Logic is the framework upon which every good mathematics research paper is built. Each theorem or equation must flow logically.

Definitions

In order for the reader to understand the author's work, definitions for terms and notations used throughout the paper must be set at the beginning of the paper. It is more effective to include this within the Introduction section of the paper rather than having a stand-alone section of definitions.

Theorems and Equations

Theorems and equations should be physically separated from the surrounding text. They will be used as reference points throughout, so they should have a well-defined beginning and end.

Math Symbols and Notations

Math symbols and notations are standardized within the mathematics literature. Deviation from these standards will cause confusion amongst readers. Therefore, the author should adhere to the guidelines for equations, units, and mathematical notation, [available from various resources](#).

Protocols for mathematics writing get very specific – fonts, punctuation, examples, footnotes, sentences, paragraphs, and the title, all have detailed constraints and conventions applied to their usage. The [American Mathematical Society](#) is a good resource for additional guidelines.

LaTeX and Wolfram

Mathematical sentences contain equations, figures, and notations that are difficult to typeset using a typical word-processing program. Both [LaTeX](#) and [Wolfram](#) have expert typesetting capabilities to assist authors in writing.

[LaTeX](#) is highly recommended for researchers whose papers constitute mathematical figures and notation. It produces professional-looking documents and authentically represents mathematical language.

[Wolfram](#) Language & System Documentation Center's Mathematica has sophisticated and convenient mathematical typesetting technology that produces professional-looking documents.

The main [differences](#) between the two systems are due to cost and accessibility. LaTeX is freely available, whereas Wolfram is not. In addition, any updates in Mathematica will come with an additional charge. LaTeX is an open-source system, but Mathematica is closed-source.

Good Writing and Logical Constructions

Regardless of the document preparation system selected, publication of a mathematics paper is similar to the publication of any academic research in that it requires good writing. Authors must apply a strict, logical construct when writing a mathematics research paper.

There are [resources](#) that provide very specific guidelines related to following sections to write and publish a mathematics research paper.

- Concept of a math paper
- Title, acknowledgment, and list of authors
- Abstract
- Introduction
- Body of the work
- Conclusion, appendix, and references
- Publication of a math paper
- Preprint archive
- Choice of the journal, submission
- Decision
- Publication

The critical elements of a mathematics research paper are good writing and a logical construct that allows the reader to follow a clear path to the author's conclusions.

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