Writing a Mathematics Research Paper

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The following is meant as a guide to the structure and basic content of a mathematical research paper.

The Structure of the Paper

The basic structure of the paper is as follows:

- Abstract (approximately four sentences)
- Introduction (approximately 1 page)
- The problem/situation (1-2 pages)
- Your idea/model (1-2 pages)
- The details (5+ pages)
- Future directions (approximately 0.5 page)
- Conclusions (approximately 0.5 page)

The following sections briefly describe the content of each of the above categories.

The Abstract

The abstract should:

- state the problem;
- state why the problem is important;
- summarize what your solution is and what the big deal about it is; and
- say what follows from your solution.

The Introduction

The Introduction should describe the problem, as well as discuss relevant work done by other people in the field. This section should have a lot of references describing what other people have done, and how your work relates.

The Introduction should also briefly describe your contributions to the study of the problem. If your paper is describing a model you have developed, for example, you want to briefly discuss what the model is and why it is important.

Finally, the Introduction should outline the entire paper. For example, you might say:

"Section 2 describes the structure of wickets. Section 3 discusses an alternate method for producing wickets. Sample results obtained from producing wickets with the proposed method are discussed in Section 4."

The Middle Sections of the Paper

The next section of the paper should discuss the problem/situation. For example, if we are trying to demonstrate that our production method for wickets is superior, we need to make sure that the reader understands what a wicket is and how it is constructed.

Once we have described the problem, the following section should discuss our idea or our model. This includes describing any approximations or assumptions made in the construction of the model, as well as what the model is intended to predict.

Next, your paper should discuss the solution of the model; analyze the behavior of the model; and demonstrate how the model describes the current behavior, and predicts the future behavior, of the system being considered (or mathematically provides an accurate description of the desired aspects of the problem).

Future Directions

This section should describe future directions your work can take. For example, what more work can you see needs to be done in developing the model? Are there more details that you might like to incorporate into the model? Can the model be applied to other situations?

Conclusions

The Conclusions section should summarize the highlights of your work, and why it is important (e.g., any potential applications of your model). You can use your abstract as a starting point.