Panel on Writing Mathematical Papers

(with a special focus on Statistics)

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Outline of the talk

Introduction

Why bother writing ?

Structure

Style

Advice

Introduction

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Aim of this talk is to :

- give you basic ideas on what is an article in a scientific journal (particularly in Statistics)
- how to write an article

Why bother writing ?

- research is useful only if it is communicated to others
  - orally in conferences or seminars (fast but ephemeral)
  - written in a scientific journal (permanent)

New research is built on previous one, that has been authenticated as original and important.

Choice of a journal

- There exists many statistical journals `http://web.maths.unsw.edu.au/~lafaye/alfjourn.html`
- Each one has a different readership in mind

Ideally, you should choose the journal before writing. Always have in mind who you are writing to.

Aim of an article

- convince the reader that your results are valid and important, now
- time of researchers is a precious resource : don't waste it !
- be concise, start with the main results very soon

Structure of an article in experimental sciences

In experimental sciences (e.g., medicine), structure is often well defined :

1. Introduction
2. Material
3. Methods
4. Results
5. Discussion

Structure of an article in statistics

In Statistics, structure is usually as follows :

1. Title (short, punchy, meaningful, informative)
2. Abstract + keywords
3. Introduction
4. Description of the problem
5. Solution to the problem and proof
6. Exemple(s)
7. Simulations
8. Discussion and/or conclusion
9. Acknowledgments (thanks, grants)
10. References
11. Appendix

The introduction

The introduction is crucial. Several readers will only read that. Some of them might read the rest of the paper, if the introduction is good enough. It should contain :

1. description of the problem studied
2. explicit description of your model
3. motivate your approach to solve the problem (e.g., originality)
4. perform a literature review : cite articles that are important (e.g., in “big” journals), recent (conveys the impression that the research is important **now**), researchers you know personally (they might referee your paper)
5. brief description of the content of the other sections (e.g., In Section 2, we ...)

Try to tell a (logical) story.

Section 2

Here you go into the details. Give the main results, theorems. Lengthy or complicated proofs are usually postponed to the Appendix.

Example

Provide access to the data, to the code used to study the data set. Choose an example that might interest a lot of people.

Simulations

Give the name(s) of the software used, including version number (e.g., R version 3.5.1). Give the platform (PC, cluster), the OS (Linux, Mac, Windows). Give indications about computing time.
Compare your findings to the main competitors, focusing on what is better for your approach. Provide a complete and well documented code that enable a total reproducibility of your results (use seeds).
Use tables or graphs. Comment the main results of the simulation.

Conclusion

Main ideas and findings in the paper. Potential for future research.

Style of an article

Our time is precious. This is not a novel. Be concise, clear, accurate, simple. Write very short sentences (one idea = one sentence). Back up each one of your claim with a reference or a clear explanation. Do not use emotional adjectives.

Advice

- Use/download a nice LaTeX template.
- Use good tools (LaTeX, Beamer).
- Read (recent) papers from the journal where you plan to submit.
- Start writing something.
- Start with writing the titles of each section, i.e., a detailed outline.
- Write a few sentences in each saying what you will put in each section.
- Refine.


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