Case study: Automatically differentiable particle filters and the pypomp project

STATS 810

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Scientific rationale

We will review slides for a relevant talk to ecological researchers, at https://ionides.github.io/talk/queens25/slides.pdf.

The pypomp project, https://github.com/pypomp

Some relevant RCRS questions are:

1. Project governance. What decisions went into https://github.com/pypomp/.github/blob/main/profile/Governance.md? What are the alternative approaches and their strengths/weaknesses?
2. Project licensing. What license was chosen and why. Does it matter?
3. Conflicts of interest and allocation of professional academic reward for work done. Where do these issues arise, and what project decisions may suppress or aggravate potential difficulties?
4. Quality control, mistakes and negligence. Does this project comply with best practices for checking correctness? What has been done for this? What more could be done?

Integrating software development with other research goals

- For research in statistical theory, methods and applications, software is a tool to improve your own research and to communicate your ideas.
- pypomp is designed to assist and enable various methodological goals:

https://github.com/pypomp/.github/blob/main/profile/proposed_papers.md

The Stan project

- Stan is a model for a wildly successful software project that has advanced theory, methods and applications:
- To see Bob Carpenter discussing the project:

https://www.youtube.com/watch?v=P9gDFHI-Hss