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Reproducible and Replicable Computational Fluid Dynamics: It's Harder Than You Think

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Summary

Talking about scientific reproducibility is great, but it is only of real value if it is put into practice. This article from authors at the George Washington University discusses how even with fairly strict adherence to reproducible research best-practices, making research truly reproducible is still challenging. Some of the most notable hurdles that the authors encountered in their attempts for reproducibility included maintaining their own codes to stand up over time, reconciling subtle but significant differences in nominally similar external libraries, and even making the decision of whether to use existing open source projects versus a home-grown code. Some more recent developments in the field of reproducible research (like Docker containers and virtual environments) allow code upkeep to be simplified, but others–like identifying the differences between the fundamentals of linear algebra libraries or deciding if an existing open-source program will actually save users once one considers how long it will take to become sufficiently proficient with that program in-question–are still quite challenging.

Exploration

This paper provided an excellent window into the mind of a scientific researcher. I appreciated the authors' thorough coverage of their scientific methods, even including their difficulties and failures during their scientific process. I believe this more wholesome approach to scientific communication is lacking from the community in general. That being said, I also feel that the authors could have been more effective when writing with consideration to their audience. The paper's message seems to be aimed at researchers in general due to it's emphasis on reproducibility (not strictly the findings of the GW work on CFD for flying snakes), but was somewhat technical for an outsider to the CFD field. I think it might have been more beneficial for the authors to provide a slightly more accessible presentation of their results. As even the article alludes during it's discussion of documentation, effective communication is as critical as providing reproducible code and methods.

Notes

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