

# Cultivating Cooperation in a Competitive Community

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A common theme in numerical mathematics is the race for the most efficient, universal and elegant algorithm for a class of problems. Yet, this principally healthy competition is only beneficial to mathematics, science, industry and society if the research output is actually comparable. The comparison of numerical algorithms can be a complex endeavor as the implementation, configuration, compute environment and test problems need to be well defined. For a single mathematician this is addressed by best practices for mathematical software, see for example [1] and references therein. Communities, around specific (numerical) problems, need, in addition to inclusive broader guidelines, infrastructure for the exchange, comparison and progress in the field. As a case study we present the groundwork and coming challenges for the *model reduction* community. Model reduction (also known as model order reduction) is a young discipline in applied mathematics concerned with the algorithmic simplification of numerical differential equation models, which has engendered numerous methods, each with many application-specific and algorithmic variants. In this regard, we point out problems, alongside possible measures with the aim to ensure scientificity and comparability of model reduction research and with the ultimate goal of becoming FAIR.

## References

- [1] J. Fehr, J. Heiland, C. Himpe and J. Saak, Best Practices for Replicability, Reproducibility and Reusability of Computer-Based Experiments Exemplified by Model Reduction Software, *AIMS Mathematics* **1** (2016), pp. 261–281. doi:bsb2