A comparison of different positivity-preserving time integration schemes.

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Over the last two decades several approaches have been suggested to numerically preserve the positivity of solutions of positive ODE systems. However, a fair comparison of the different schemes has not yet been made.

For this reason, we are developing PositiveIntegrators.jl [1], a Julia package designed to provide efficient implementations of various positive time integration methods. The current focus is on modified Patankar–Runge–Kutta schemes, but many other methods will follow. In addition, PositiveIntegrators.jl extends Julia's standard ODE package OrdinaryDiffEq.jl, which makes it possible to compare the methods of both packages.

In the talk, we will present the current status of the package and show first comparisons of the available methods.

References

1. PositiveIntegrators.jl: A Julia library of positivity-preserving time integration methods, Kopecz, S, Ranocha, H. and contributors, 2023, `https://github.com/SKopecz/PositiveIntegrators.jl`

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