

*Positivity preservation of time-stepping methods*

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Spatial discretization of some partial differential problems (PDEs) give rise to ordinary differential equations (ODEs). Sometimes, the solutions to these PDEs have qualitative properties, e.g., positivity, which are relevant in the context of the problem. In these cases, it is convenient to preserve these properties both in the spatial discretization of the PDE and in the time stepping process of the resulting ODE.

A common class of methods widely used in the literature are Runge-Kutta methods. For these schemes, positivity can be ensured under certain step-size restrictions given in terms of the radius of absolute monotonicity. However, for some problems, several schemes with trivial radius of absolute monotonicity also provide positive solutions.

In this talk we will explain how, under additional conditions on the problem, positivity can be obtained for some methods with trivial radius of absolute monotonicity.