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Positivity Preserving Nonstandard Finite Difference Scheme for a Modified Parabolic

Reaction-Advection-Diffusion PDE.

The nonstandard finite difference (NSFD) scheme methodology can be employed to construct a discretization for a parabolic partial differential equation (PDE) that has linear advection and diffusion and with a nonlinear reaction term. We will show how to construct a scheme that preserves the positivity of solutions and, as a consequence, a functional relationship exists between the space and time step-sizes. (Received September 12, 2020)