

عنوان مقاله:

Split-step finite difference schemes for solving the nonlinear Fisher Equation

محل انتشار:

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خلاصه مقاله:

In this work, we propose several simple but accurate finite difference schemes to approximate the solutions of the nonlinear Fisher equation, which describes an interaction between logistic growth and diffusion process occurring in many biological and chemical phenomena. All schemes are based upon thetime-splitting finite difference approximations. The operator splitting transforms the original problem into two subproblems: nonlinearlogistic and linear diffusion, each with its own boundary conditions. The diffusion equation is solved by three well-known stable and consistent methods while the logistic equation by a combination of method of lagging and a two-step approximation that is not only preserve positivity but also boundedness. The new proposed schemes and the previous standard schemes are testedon a range of problems with analytical solutions. A comparison showsthat the new .schemes are simple, effective and very successful in solving the Fisher equation

کلمات کلیدی:

Fisher equation, Finite difference schemes, Method of lagging, Operator splitting, Reaction-diffusion equation

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