A new modified schemes for shallow water linear equations and Burgers nonlinear equation

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Abstract

This work concerns the study of the linear equations of the shallow water and the nonlinear equation of Burgers for a perfect fluid and a weakly viscous fluid. For the equations of shallow water, the phenomenon is modeled by a system of improved equations of Boussinesq. We add to them the numerical dispersion due to truncation errors (discretization errors). For the solution, we adopt the finite difference method combined with the implicit scheme of the alternate direction. In the same way, we proceed for the nonlinear equation of Bourgers. Then, we study the stability and the convergence of the solution and make a comparison with some existing results. Finally for illustration, we present numerical simulations.

Keywords: Boussinesq equations, Bourgers equation, Modified schemes, Stability and convergence.