Phase-fitted and amplification-fitted diagonally implicit Runge-Kutta method for the numerical solution of periodic problems

ABSTRACT

In this study, we construct a new Phase-fitted and Amplication-fitted Diagonally Implicit Runge-Kutta method (PFAFDIRK) for the numerical integration of first order Initial Value Problems (IVPs) which possesses oscillatory solutions. The phase-fitted and amplification-fitted method is based on existing Diagonally Implicit Runge-Kutta method (DIRK) of order four. The numerical results show that the proposed method is more efficient than the existing DIRK methods.

Keyword: Diagonally implicit Runge-Kutta method; ODEs; Oscillatory IVPs; Phase fitted; Amplification fitted