Zero-dissipative explicit Runge-Kutta method for periodic initial value problems

ABSTRACT

In this paper zero-dissipative explicit Runge-Kutta method is derived for solving second-order ordinary differential equations with periodical solutions. The phase-lag and dissipation properties for Runge-Kutta (RK) method are also discussed. The new method has algebraic order three with dissipation of order infinity. The numerical results for the new method are compared with existing method when solving the second-order differential equations with periodic solutions using constant step size.

Keyword: Dissipation; Oscillatory solutions; Phase-lag; Runge- Kutta methods