An embedded 5(4) explicit Runge-Kutta-Nyström method with dissipation of high order

ABSTRACT

A new 5(4) embedded explicit Runge-Kutta-Nystrom (RKN) method with dissipation of high order is developed to solve integration of initial-value problems for second-order ordinary differential equations possessing oscillating solutions. The fifth order formula has dispersive order eight and dissipative order nine. The fourth-order embedded formula is obtained to control the local truncation errors. Numerical experiments indicate that the new method is more efficient than the existing embedded explicit RKN methods.

Keyword: Embedded explicit Runge-Kutta-Nyström; Oscillatory solutions; Phase-lag