

New explicit trigonometrically-fitted fourth-order and fifth-order Runge-Kutta-Nyström methods for periodic initial value problems

ABSTRACT

In this work, we derive two new Runge-Kutta-Nyström (RKN) methods for solving periodic second order ordinary differential equations. We constructed these methods based on the RKN method of three-stage fourth-order derived by Garcia and RKN method of four-stage fifth-order derived by Hairer. The numerical results show that the efficiency of the new methods is more than the other existing methods.

Keyword: Trigonometric fitting; RKN methods; Periodic initial value problems