Two derivative Runge-Kutta method with FSAL property for the solution of first order initial value problems

ABSTRACT

A new Two Derivative Runge-Kutta method (TDRK) based on First Same as Last (FSAL) technique for the numerical solution of first order Initial Value Problems (IVPs) is derived. We present a fourth order three stages TDRK method designed using the FSAL property. The stability of the new method is analyzed. The numerical experiments are carried out to show the efficiency of our methods in comparison with other existing Runge-Kutta methods (RK).

Keyword: Explicit methods; FSAL technique; IVPs; TDRK methods