

## **Embedded diagonally implicit Runge–Kutta–Nystrom 4(3) pair for solving special second-order IVPs**

### **ABSTRACT**

In this paper, third-order 3-stage diagonally implicit Runge–Kutta–Nystrom method embedded in fourth-order 4-stage for solving special second-order initial value problems is constructed. The method has the property of minimized local truncation error as well as the last row of the coefficient matrix is equal to the vector output. The stability of the method is investigated and a standard set of test problems are tested upon and comparisons on the numerical results are made when the same set of test problems are reduced to first-order system and solved using existing Runge–Kutta method. The results clearly shown the advantage and the efficiency of the new method

**Keyword:** Special second-order, Runge–Kutta–Nystrom, Stability