

## **A five-stage singly diagonally implicit Runge-Kutta-Nyström method with reduced phase-lag**

### **ABSTRACT**

In this paper, a singly diagonally implicit Runge-Kutta-Nyström (RKN) method is constructed for solving second-order ordinary differential equations (ODE) with oscillatory solutions. The produced method is 5-stage, algebraic order five, and phase-lag (or dispersion) order eight at a cost of five function evaluations per step. The method is more accurate compare to current existing similar type of methods for the numerical integration of second-order differential equations with periodic solutions by using constant step size.

**Keyword:** Diagonally implicit; Oscillatory solutions; Phase-lag; Runge-Kutta-Nyström methods