

## **A new optimized Runge-Kutta method for solving oscillatory problems**

### **ABSTRACT**

A new explicit Runge-Kutta method of fifth algebraic order is developed in this paper, for solving second-order ordinary differential equations with oscillatory solutions. The new method has zero phase-lag, zero amplification error and zero first derivative of the phase-lag. Numerical results show that the new proposed method is more efficient as compared with other Runge-Kutta methods in the scientific literature, for the numerical integration of oscillatory problems.

**Keyword:** Runge-Kutta method; Phase lag; Amplification error; Oscillatory problems