

## **Optimized fourth-order Runge-Kutta method for solving oscillatory problems**

### **ABSTRACT**

In this article, we develop a Runge-Kutta method with invalidation of phase lag, phase lag's derivatives and amplification error to solve second-order initial value problem (IVP) with oscillating solutions. The new method depends on the explicit Runge-Kutta method of algebraic order four. Numerical tests from its implementation to well-known oscillatory problems illustrate the robustness and competence of the new method as compared to the well-known Runge-Kutta methods in the scientific literature.

**Keyword:** Runge-Kutta method; Oscillatory problems