

## Diagonally implicit Runge-Kutta method of order four with minimum phase-lag for solving first order linear ODEs

### ABSTRACT

In this paper we derived a new diagonally implicit Runge-Kutta method of order four with minimum phase-lag for solving first order linear ordinary differential equation. The stability polynomial of the method is obtained and the stability region is presented. A set of problems are tested upon and numerical results proved that the method is more accurate compared to other well known methods in the scientific literature.

**Keyword:** Diagonally implicit Runge-Kutta method; Linear ordinary differential equations; Phase-lag