

**A COMPARATIVE STUDY ON SOLVING FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS USING NUMERICAL METHODS**

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Ordinary differential equations (ODEs) are widely applicable in numerous fields such as in population dynamics and bioscience. Practically, it is too difficult to solve complex differential equations to obtain an exact solution and hence, approximation methods are used for the solutions. In this paper, we used numerical methods to solve first order ODEs. There are several numerical methods among which Euler Method and the fourth order Runge Kutta (RK4) Method were compared in this proposed study. The first order ODE,  $\frac{dy}{dt} = t^2 + y$ ,  $y(0) = 1$  was used for the implementation of proposed approach. According to the findings, the maximum error obtained for each method namely Euler and RK4 are proportional to  $h$  and  $h^4$  to each method respectively where,  $h$  denote the step size. The results obtained in this study show that RK4 performs well for ODEs with near approximate solutions with less error. Further, it is obvious that step size vastly influences the performance as when step size decreased the approximate solution approached to near original solution. We implemented the proposed approach with a suitable example of first order ODE as given in the above equation to compare and illustrated the fact that numerical methods provide acceptable near approximate solution to solve ODEs.

**Keywords:** Ordinary Differential Equations, Numerical Methods, Euler Method, Runge Kutta Method

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