

Comparing Numerical Accuracy of Solutions of Ordinary Differential Equations (ODE) Using Taylor's Series Method, Euler's Method and Runge-Kutta (RK) Method

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Abstract : The ordinary differential equations (ODE) represent a natural framework for mathematical modeling of many real-life situations in the field of engineering, control systems, physics, chemistry and astronomy etc. Such type of differential equations can be solved by analytical methods or by numerical methods. If the solution is calculated using analytical methods, it is done through calculus theories, and thus requires a longer time to solve. In this paper, we compare the numerical accuracy of the solutions given by the three main types of one-step initial value solvers: Taylor's Series Method, Euler's Method and Runge-Kutta Fourth Order Method (RK4). The comparison of accuracy is obtained through comparing the solutions of ordinary differential equation given by these three methods. Furthermore, to verify the accuracy; we compare these numerical solutions with the exact solutions.

Keywords : Ordinary differential equations (ODE), Taylor's Series Method, Euler's Method, Runge-Kutta Fourth Order Method

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