RUNGE-KUTTA VERSION FOR SOLVING FIRST ORDER ORDINARY DIFFERENTIAL EQUATION

NURUL AIN NASUHA BINTI MOHAMAD RUSLAN

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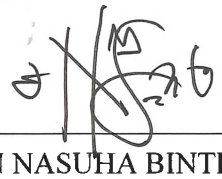
DECLARATION BY CANDIDATE

I certify that this report and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



NURUL AIN NASUHA BINTI MOHAMAD RUSLAN

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ABSTRACT

Most problems in engineering and science field can be in the form of ordinary differential equations. In addition, the solution of ordinary differential equations problem can be solved either in theoretical and numerical methods. The theoretical method is known to have their difficulty in solving ordinary differential equations problem whereas this method requires a substantial amount of laborious work and it is complicated. Therefore, a numerical method is preferable to be used such as Runge-Kutta methods. Runge-Kutta is widely used by many researchers for solving the ordinary differential equation in initial value problem. Some methods to be used to solve ordinary differential equation are Second Order Runge-Kutta method (RK2), Third Order Runge-Kutta method (RK3), Fourth Order Runge-Kutta method (RK4), Runge-Kutta Fehlberg method (RKF) and Fifth Order Runge-Kutta method (RK5). The purpose of this research is to identify which method is most efficient based on its errors and computation time. The results of the numerical solution are compared with a theoretical solution. The result shows that RK2 has the less computation time but less accuracy while RK5 has the highest computation time but high accuracy.

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