

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**A NUMERICAL SOLUTION BY USING RUNGE KUTTA
METHOD AND EULER METHOD TO PREDICT THE
EVOLUTION OF DENGUE FEVER DISEASE**

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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ABSTRACT

Dengue fever is a typical tropical, and subtropical disease found primarily in urban and suburban areas. It is widely diffused throughout the tropical region, with local risk variations influenced by rainfall, temperature, and rapid but unplanned urbanization. Since 1902, Malaysia, a nation in Southeast Asia, has reported cases of dengue disease (Salim, N.A.M., Wah, Y.B., Reeves, 2021). In the 1970s, the condition became a public health concern, with its first significant outbreak in 1973 (Cheah et al., 2014). The Runge Kutta Fourth Order (RK4) method is a well-known and efficient approach for resolving initial-value problems in differential equations. RK4 method is widely used to solve chaotic systems. However, not much research explores the RK4 method on dengue infection rate. Thus, this study was conducted to determine the number of people infected by dengue fever disease using the RK4 and Euler methods. This study also wants to compare the absolute errors between the RK4 and Euler methods to identify the best method to forecast the number of people affected by dengue fever for 50 weeks. We apply the basic SIR model by transforming mathematical formulation using the RK4 and Euler methods into the SIR model to compute the result for this study. The result shows that the RK4 method is more effective and accurate than the Euler method since the number of errors for the RK4 method is smaller than the Euler method.