UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

NUMERICAL SOLUTION OF SIR MODEL FOR DENGUE FEVER TRANSMISSION IN SELANGOR, MALAYSIA WITH VARIATIONAL ITERATION METHOD AND RUNGE-KUTTA METHOD

NURUL IZZATI SYAZWANI BINTI MOHD RAZI 2020845036 CS2496A1
NUR AINA FARHANA BINTI ROSLI 2020819872 CS2496A1
NUREEN JAZLINA BINTI AZLISHAM 2020819644 CS2496A1

Supervisor:
Puan Rosha Mohamed

Bachelor of Science (Hons.) (Mathematics)
Center of Mathematics Studies
College of Computing, Information and Media

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TABLE OF CONTENTS

ABSTRACT

One of the biggest public health issues in Malaysia is dengue fever, an infectious disease spread by the bite of an Aedes mosquito in Malaysia. The number of dengue fever infections has been frequently increasing with periodic outbreaks occurring every few years. Dengue hemorrhagic fever and dengue shock syndrome are only two of the serious consequences that can occur from the disease, which puts a significant burden on the healthcare system. Most of the time, clinical symptoms and laboratory testing are used to diagnose the disease. In this research, mathematical models are powerful tools to be considered in the spread of many infectious diseases, one amongst which is Dengue Fever (DF). The main objective of this paper is to form a susceptible-infected-recovered (SIR) model for dengue fever transmission. Then, we implemented fourth-order Runge-Kutta Method (RK4) and the Variational Iteration Method (VIM) for solving the SIR Model by using Excel and Maple Software. Lastly, we discussed the numerical comparison between RK4 and VIM method by comparing the numerical solution between two methods.

A complex cycle was involved between mosquitoes and human hosts. A female Aedes mosquito feeds on the blood of an infected person to begin the cycle. Along with the blood, the mosquito also ingests the dengue virus. After an incubation period, the virus reproduces inside the mosquito's body and moves to its salivary glands. The virus can spread to people when the infected mosquito feeds on blood once again.