Universiti Teknologi MARA

Susceptible-Exposed-Infected-Recovered (SEIR) Model for Dengue Outbreak in Malaysia

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STUDENT'S DECLARATION

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

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ABSTRACT

Dengue fever is one of the fast-viral diseases that occur around the world. The Ministry of Health Malaysia stated that dengue fever is one of the viral diseases spread by mosquitoes with infected bites. Infection by this type of mosquitoes can lead to dengue fever or other illnesses, such as Malaria and Zika fever. By the end of the year 2019, the total number of dengue cases was 130101 recorded. Therefore, there is a need of having a mathematical model to make observations on the outbreak of the infectious disease. This study aims to develop a mathematical model for the dengue outbreak in Malaysia. Secondary data collected from Pusat Informatik Kesihatan Malaysia and Jabatan Perangkaan Malaysia was used in this study. The data consists of the number of cases, the number of deaths, and the number of populations within the years 2013 to 2017. Susceptible-Exposed-Infected-Recovered (SEIR) mathematical model was used in this study to calculate the number of susceptible, the number of exposed, number of infected, and the number of recovered in the population. Maple is used to generating the graph and result of the SEIR model. The result shows that the number of susceptible approaching zero and pass through zero. Next, the number of the exposed individual eventually decreased later. This means that the people are aware of the transmission of dengue fever and they build awareness in controlling dengue fever. The number of infected individuals decreases, and the number of recovered individuals increases. Then, the longevity of the disease has been calculated by using basic reproductive ratio and the result shows that the disease will continue to grow in the future since dengue is an endemic disease.

Keywords: Susceptible-Exposed-Infected-Recovered (SEIR), Dengue outbreak in Malaysia, Basic Reproductive Ratio

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