

## **Analysis of the fractional order dengue transmission model: a case study in Malaysia**

### **ABSTRACT**

Dengue is one of the important infectious diseases in the world. In Malaysia, dengue occurs nationally and has been endemic for more than a decade. Hence, the modeling of dengue transmission is of great importance to help us understand the dynamical behavior of the disease. In this paper, we developed a compartmental model of the dengue transmission using the fractional order differential equation. It consists of six compartments representing the human and mosquito dynamics. The disease-free and the positive endemic equilibrium point are obtained. The stability analysis of the equilibria is presented. A sensitivity analysis of the model is performed to determine the relative importance of the model parameters to the transmission. Numerical simulations are given for different parameter settings. A case study, using the outbreak dengue data in the state of Selangor, Malaysia, in 2012, is presented.

**Keyword:** Fractional system; Dengue; Stability analysis; Reproduction number; Sensitivity analysis