

**UNIVERSITI TEKNOLOGI MARA**

**TECHNICAL REPORT**

**PERFORMANCES OF SIR, SEIR AND SEIRS MODELS IN  
PREDICTING THE COVID-19 CASES IN MALAYSIA**

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

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## **ABSTRACT**

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age. The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads. The situation can even become more complicated when the ambiguity about the duration and ultimate spread of the pandemic is unknown. It is especially critical for the governments, healthcare systems, and economic sectors to have an estimate of the future of this disaster. This study simulated the infectious count for the same duration to assess the predictive capability of the Susceptible-Infectious-Recovered (SIR) model, Susceptible-Exposed-Infected-Recovered (SEIR) model, Susceptible-Exposed-Infected-Recovered-Susceptible (SEIRS) model in predicting the pattern of COVID-19 cases in Malaysia and compare. By using different mathematical approaches, many investigators have tried to predict the outbreak of COVID-19. This study aims to suggest the best model that can represent COVID-19 cases in Malaysia. In this study, the epidemic in Malaysia have been simulated by using those models and all models have been solved by using Runge-Kutta Fehlberg (RKF45) method via MATLAB. Then, the performance of each model has been compared with the data of COVID-19 cases in Malaysia. After the comparison have been made, it can be concluded that among the three models that have been compared, SEIRS model is the best model in representing the pattern of COVID-19 cases in Malaysia due to its simulation's result as it shows SEIRS is the model that is nearest to the actual data. For future recommendation, we can explore more on SEIRD model, and we can consider the death rate in the study. This can contribute especially for the medical expertise in doing the treatment plan for COVID-19 cases in Malaysia.