

**Abstract**

The global outbreak of COVID-19, first detected in Wuhan, China, in late 2019, has rapidly escalated into a pandemic affecting many countries around the world, including Indonesia. Among the affected areas in Indonesia, Bandung, a city in West Java, has experienced a significant spread of the virus. This study focuses on predicting the spread of COVID-19 in Bandung using the Susceptible, Infected, Recovered (SIR) model, a basic framework in epidemiology. The SIR model in this study was solved using the Runge-Kutta Order 4 (RK4) method, a numerical approach known to have high accuracy in solving differential equations. This study aims to evaluate the effectiveness and accuracy of the SIR model when combined with the RK4 method in predicting the dynamics of COVID-19 transmission in Bandung. The findings of this study indicate that this approach is quite accurate and effective, as evidenced by the low RMSE values of 0.15 for infected cases and 0.7 for recovered cases. The close agreement between model predictions and actual data underscores the importance of accurate calibration of the model's transmission rate ( $\beta$ ), as it significantly affects the accuracy of model predictions. This study highlights the potential of the SIR model enhanced with the RK4 method as a reliable tool for predicting pandemic trends in Bandung.

**Keywords:** COVID-19, SIR Model, Runge-Kutta 4<sup>th</sup> Order