

## ABSTRAK

Penelitian ini membahas analisis kestabilan model epidemi SIR COVID-19 dengan tingkat insidensi konveks. Model memiliki dua titik ekuilibrium, yaitu titik ekuilibrium bebas penyakit dan titik ekuilibrium endemik. Hasil analisis menunjukkan bahwa titik ekuilibrium bebas penyakit stabil asimtotik jika  $R_0 < 1$ , sedangkan titik ekuilibrium endemik stabil asimtotik jika  $R_0 > 1$  dan syarat kestabilan lainnya terpenuhi. Selanjutnya dilakukan pencocokan model terhadap data kasus COVID-19 di Indonesia untuk mengestimasi parameter model dan analisis sensitivitas untuk menentukan parameter yang paling berpengaruh terhadap bilangan reproduksi dasar. Sebagai implementasi model, dilakukan simulasi numerik menggunakan perangkat lunak Python untuk menggambarkan dinamika penyebaran COVID-19.

**Kata kunci:** *COVID-19, Model SIR, Tingkat Insidensi Konveks, Kestabilan, Analisis Sensitivitas.*

## ABSTRACT

This study discusses the stability analysis of a COVID-19 SIR epidemic model with a convex incidence rate. The model has two equilibrium points, namely the disease-free equilibrium point and the endemic equilibrium point. The results show that the disease-free equilibrium point is asymptotically stable when  $R_0 < 1$ , whereas the endemic equilibrium point is asymptotically stable when  $R_0 > 1$  and the other stability conditions are satisfied. Furthermore, model fitting was performed using COVID-19 case data in Indonesia to estimate the model parameters, followed by sensitivity analysis to determine the parameters that have the greatest influence on the basic reproduction number. As an implementation of the model, numerical simulations were carried out using Python software to describe the dynamics of COVID-19 transmission.

**Keywords:** *COVID-19, SIR Model, Convex Incidence Rate, Stability, Sensitivity Analysis.*