

## Policy-Guided Susceptible-Infected-Recovered Modeling of the COVID-19 Spread in Texas

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### Abstract

The goal of this research was to create an SIR model for the Texas COVID-19 cases based on the state data from March of 2020 through October of 2020, and to investigate the impact of public policies on the transmission of COVID. The data was pre-processed using Excel; some basic time series graphs were produced in Excel as well. All other data analysis, including the production of all graphs relating to the SIR model, was performed in R. Difficulty in estimating the model parameters by the maximum likelihood method was encountered due to the short durations between the implementation dates of various policies designed to curb the spread of COVID-19. Examining the estimate trends of beta, gamma, and  $R_0$ , a stabilizing pattern for  $R_0$  was observed over time, which would require further investigations to understand the epidemiology of COVID-19 in Texas.

**Keywords:** epidemiology of COVID-19, maximum likelihood estimation, mitigation strategies, susceptible-infected-recovered model