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Mathematical modeling for novel coronavirus (COVID-19) and control. (English)


Summary: In the present investigations, we construct a new mathematical for the transmission dynamics of corona virus (COVID-19) using the cases reported in Kingdom of Saudi Arabia for March 02 till July 31, 2020. We investigate the parameters values of the model using the least square curve fitting and the basic reproduction number is suggested for the given data is $R_0 \approx 1.2937$. The stability results of the model are shown when the basic reproduction number is $R_0 < 1$. The model is locally asymptotically stable when $R_0 < 1$. Further, we show some important parameters that are more sensitive to the basic reproduction number $R_0$ using the PRCC method. The sensitive parameters that act as a control parameters that can reduce and control the infection in the population are shown graphically. The suggested control parameters can reduce dramatically the infection in the Kingdom of Saudi Arabia if the proper attention is paid to the suggested controls.

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MSC:

92D30 Epidemiology
34D20 Stability of solutions to ordinary differential equations

Keywords:

COVID-19 mathematical model; global sensitivity analysis; numerical results; parameters estimations; real data; stability results

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References:


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