

An optimal control analysis of a COVID-19 model.

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Abstract

This paper aims to explore the optimal control of the novel pandemic COVID-19 using non-clinical approach. We formulate a mathematical model to analyze the transmission of the infection through different human compartments. By applying a sensitivity test, we obtain the sensitivity indexes of the parameters involved in the transmission of the disease. We demonstrate the most active/sensitive parameters to analyze the spread of the coronavirus COVID-19. The most active transmission parameters are interposed by introducing control variables. The control intervention is in the form of smart lockdown, frequent handwash, and control of the disease's side effects, face mask, and sanitizer. We Formulate Hamilton and Lagrangian to investigate the existence of the optimal control. Pontryagin's Maximum Principle describes the control variables in the optimal control model. The objective function is designed to reduce both the infection and the cost of interventions. We use numerical simulation to verify the results of the control variables by Matlab 2019.