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**Modeling and Analysis of COVID-19 and Dynamical Systems in Biology and Physics**[1] VLADIMIR GRBIC, University of Central Florida — In mathematics and science, dynamical systems are an area of study that describes how states of any system change over time. Their immense usefulness rises from the fact that by discovering the equations that govern such a system, we can model and predict its future behavior. In this study, we propose a new deterministic model for COVID-19 propagation. Our model should serve two purposes. First, we use it to approximate the infected and deceased individuals after a given time during the pandemic. Then, using a linearized subsystem describing infectious compartments about the disease-free equilibrium (DFE), we determine the basic reproductive number ($\mathcal{R}_{\prime}$) by the next-generation matrix method. So far, the model makes accurate predictions in short-term intervals that agree with the current data on COVID-19 and predicts that the basic reproductive number ($\mathcal{R}_{\prime}$) is 6.6208. That tells us that an infected individual, on average, infects about 6 other susceptible individuals. Hence, this study yields a mathematical model according to which we can make predictions of how COVID-19 will advance over time, and what additional measures are being overlooked in this situation. That, we believe, will be of great interest to public health.

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