

Abstract Submitted  
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**A One Dimensional Stochastic Susceptible-Infectious-Recovered Model and its Variations: a Hamiltonian Approach** ALI HAMED, Washington and Lee University, DIA'A BISHARAT, MOHAMAD AMINE, IRINA MAZILU, Washington and Lee — The spread of an infectious disease is a random process, and a stochastic approach to the problem is justified. The susceptible-infectious-recovered model (SIR) describes the evolution of three types of individuals (in a small community) which undergo an infection and recovery mechanism. The model (and its variations) predicts the number of infected individuals over a certain period of time, gives an estimate of the maximum possible number of infected people, and predicts how long the disease will be threat to the examined community. Using a quantum mechanical approach, we investigate four variations of the original SIR model and compare our analytical findings with the computer simulation results. We also calculate correlations between infected and recovered individuals, and find a good agreement between theory and computer simulations.

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