Modeling epidemics dynamics on heterogenous networks

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Abstract

The dynamic and possible outbreak of an epidemic in metapopulation is discussed. Following recent studies, the SIS process on heterogenous networks, where different local communities connected by travelers, are studied. We suggest a new modeling technique for traveler's movement, so that this movement will not interfere with the demographic parameters characterizing the metapopulation. We present a solution to the deterministic reaction-diffusion equations that emerge from this model on a general network, and consider in particular the star network both analytically and by simulation of the fully stochastic dynamics. While movement always increases the chance of an outbreak, Quite counterintuitively, it may decrease the steady-state fraction of sick individuals.