ABSTRACT | Ganna Rozhnova

Title

Fluctuations and oscillations in epidemic models with spatial correlations

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Abstract

We show that the simplest stochastic epidemiological models with spatial correlations exhibit two types of oscillatory behavior in the endemic phase. In a large parameter range, the oscillations are due to resonant amplification of stochastic fluctuations, a general mechanism first reported for predator-prey dynamics. In a narrow range of parameters that includes many infectious diseases which confer long lasting immunity the oscillations persist for infinite populations. This effect is apparent in simulations of the stochastic process in systems of variable size, and can be understood from the phase diagram of the deterministic pair approximation equations. Finally, we discuss the relevance of the stochastic and deterministic pair approximation models to understand the behavior of simulations on networks of homogeneous degree.