
A stochastic epidemic model with progressive loss of immunity, large population limit and long time behaviour

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Résumé

I will present a general model for the spread of an epidemic in a closed population, assuming that the infectivity of infected individuals is a random function of the time elapsed since their last infection, and that infected individuals lose their acquired immunity in a progressive and random manner after their recovery. I will present a result on the large population limit of this model, in which the evolution of the epidemic can be described by a deterministic system of integral equations, and I will present some results on the long time behaviour of this system. The salient feature of this deterministic system is that it presents an interesting threshold phenomenon at some critical value of R_0 , above which the epidemic may sustain itself forever (called the endemic threshold). Our analysis provides some information on how this threshold depends on the randomness of the acquired immunity after an infection. This is joint work with Guodong Pang, Etienne Pardoux and Arsène Brice Zotsa-Ngoufack

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