The duration of an SIR epidemic on a configuration model

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Abstract

We consider the spread of a stochastic SIR (Susceptible, Infectious, Recovered) epidemic on a configuration model random graph. We focus especially on the final stages of the outbreak and provide limit results for the duration of the entire epidemic, while we allow for non-exponential distributions of the infectious period and for both finite and infinite variance of the asymptotic degree distribution in the graph.

Our analysis relies on the analysis of some subcritical continuous time branching processes and on ideas from first-passage percolation.

Keywords: SIR epidemics; Time to extinction; Branching process approximation; First passage percolation.