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End of an SIR epidemic on a configuration model

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Abstract

We consider an SIR (Susceptible-Infective-Recovered) epidemic on a configuration model network of contacts. To approximate the spread of the disease, we use branching processes. The main objective is to make inference about the final stages of the epidemic. We derive the distribution of the ultimately susceptible individuals (those who escape the epidemic) and calculate the fraction of their neighbors which are also ultimately susceptible. The most important result is that, under certain regularity conditions, the distribution of the time until the epidemic is completely eradicated has an exponentially declining tail. This will lead us to conclude that, even though a disease might take off quickly, it will nevertheless persist for a much longer time.

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