

Workshop in Stochastic Analysis and Applications

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Renewal Contact Processes

Abstract

This talk is based on joint works in collaboration with L. R. Fontes, D. Marchetti, and T. Mountford. We investigate a non-Markovian analogue of the Harris contact process on Z^d . An individual is attached to each site and it can be infected or healthy; the infection propagates to healthy neighbors as in the usual contact process, according to independent exponential times with a fixed rate. Nevertheless, the possible recovery times for an individual are given by the points of a renewal process with heavy tail; the renewal processes are assumed to be independent for different sites. In [1], we show that if the interarrival distribution has a tail bounded from below by t^{-a} for some $a < 1$ (plus some regularity conditions), then the process survives for any positive value of the infection rate. In [2], a robust argument shows that the critical infection rate is positive in any dimension whenever the interarrival distribution has finite second moment. We also show that in one dimension the same holds when the interarrival distribution has decreasing hazard rate and tail bounded by t^{-a} with $a > 1$.

[1] L. R. Fontes, T. S. Mountford, D. H. U. Marchetti, M. E. Vares. Contact process under renewals I. arXiv: 1803.01458 [math.PR]

[2] L. R. Fontes, T. S. Mountford, M. E. Vares. Contact process under renewals II. arXiv: 1803.01460 [math.PR]