universität innsbruck

Department of Mathematics

Inn'formal Probability Seminar

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"The spread of an infection on a moving interacting population."

Abstract:

In this talk, we consider a model for the spread of an infection within a moving population on the integer lattice. Each site initially contains a number of individuals that move and interact with one another. At time zero, a certain set of individuals are infected. Infection spreads when an infected particle jumps onto a site containing healthy particles, or when a healthy particle jumps onto a site containing infected ones. Kesten and Sidoravicius [Ann. of Math. 167 (2008)] established a shape theorem for the set of infected sites when the infection starts from the origin and individuals move as independent simple symmetric random walks. We investigate the case where individuals move according to a zero-range process, thus interacting when they occupy the same site. For the one-dimensional case, we establish a Law of Large Numbers (LLN) for the rightmost infected, extending the Kesten-Sidoravicius result to this interacting environment, although only in one-dimension. Furthermore, in a model where particles can recover, we prove that an infection starting from a single site dies out almost surely when the particle density is sufficiently low. Our methods are robust and can also be applied to study the LLN for ballistic random walks in environments evolving as a zero-range process.

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HS 11 | Architecture building