מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Geometric Functional Analysis and Probability Seminar

,Ziskind Building
on Thursday, Apr 21, 2016
at 11:00

Room 155

Atilla Yilmaz
Koc University

Large deviations for random walk in space-time random environment: averaged vs. quenched

Abstract:

I will present recent joint work with F. Rassoul-Agha (Utah) and T. Seppalainen (Madison) where we consider random walk on a hypercubic lattice of arbitrary dimension in a space-time random environment that is assumed to be temporally independent and spatially translation invariant. The large deviation principle (LDP) for the empirical velocity of the averaged walk (i.e., level-1) is simply Cramerâ□□s theorem. We take the point of view of the particle and establish the process-level (i.e., level-3) averaged LDP for the environment Markov chain. The rate function $I_{3,a}$ is a specific relative entropy which reproduces Cramerâ□□s rate function via the so-called contraction principle. We identify the unique minimizer of this contraction at any velocity and analyse its structure. When the environment is spatially ergodic, the level-3 quenched LDP follows from our previous work which gives a variational formula for the rate function $I_{3,q}$ involving a Donsker-Varadhan-type relative entropy H_q. We derive a decomposition formula for $I_{3,a}$ that expresses it as a sum of contributions from the walk (via H_q) and the environment. We use this formula to characterize the equality of the level-1 averaged and quenched rate functions, and conclude with several related results and open problems.

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