Law of large numbers for non-elliptic random walks in dynamic random environments

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Abstract

In this paper we prove a law of large numbers for a general class of $\mathbb{Z}^d$-valued random walks in dynamic random environments, including examples that are non-elliptic. We assume that the random environment has a certain space-time mixing property, which we call conditional cone-mixing, and that the random walk has a tendency to stay inside wide enough space-time cones. The proof is based on a generalization of the regeneration scheme developed by Comets and Zeitouni [5] for static random environments, which was recently adapted by Avena, den Hollander and Redig [1] to dynamic random environments. We exhibit a number of one-dimensional examples to which our law of large numbers applies. For some of these examples the sign of the speed can be determined.

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