Quenched invariance principles for random walks in random environment conditioned to stay positive

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Abstract

We consider a random walk $\{S_n\}_{n\in\mathbb{N}}$ in random environment (in time) ξ. For almost each realization of ξ, we prove a quenched invariance principles for the random walk conditioned to stay positive (which specified by the Doob h-transform of the original one). To this end, a key step is to formulate a (quenched) harmonic function. Although the traditional approach Wiener-Hopf factorisation dose not work in this case, we prove the existence of the (quenched) harmonic function under the annealed $2+\epsilon$ (for some $\epsilon > 0$) moment condition on the increments. This is a joint work with Shengli Liang.