Asymptotic entropy and Green speed for random walks on countable groups

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Abstract: We study asymptotic properties of the Green metric associated to transient random walks on countable groups. We prove that the rate of escape of the random walk computed in the Green metric equals its asymptotic entropy. The proof relies on integral representations of both quantities with the extended Martin kernel. In the case of finitely generated groups, where this result is known (Benjamini & Peres, 1994), we give an alternative proof relying on a version of the so-called fundamental inequality (relating the rate of escape, the entropy and the logarithmic volume growth) extended to random walks with unbounded support.

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