A Bound for the Distribution of the Hitting Time of Arbitrary Sets by Random Walk

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Abstract

We consider a random walk $S_n = sum_{i=1}^n X_i$ with i.i.d. X_i. We assume that the X_i take values in $Bbb Z^d$, have bounded support and zero mean. For $A subset Bbb Z^d, A ne emptyset$ we define $tau_A = inf{n ge 0: S_n in A}$. We prove that there exists a constant C, depending on the common distribution of the X_i and d only, such that $sup_{emptyset ne A subset Bbb Z^d} P {tau_A =n} le C/n, n ge 1$.

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