Mathematics > Probability

Upper bounds for the maximum of a random walk with negative drift

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Consider a random walk $S_n=\sum_{i=0}^n X_i$ with negative drift. This paper deals with upper bounds for the maximum $M=\max_{n\ge 1}S_n$ of this random walk in different settings of power moment existences. As it is usual for deriving upper bounds, we truncate summands. Therefore we use an approach of splitting the time axis by stopping times into intervals of random but finite length and then choose a level of truncation on each interval. Hereby we can reduce the problem of finding upper bounds for M to the problem of finding upper bounds for $M_\tau=\max_{n\le \tau}S_n$. In addition we test our inequalities in the heavy traffic regime in the case of regularly varying tails.

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