On large deviations of multivariate heavy-tailed random walks

Abstract

Let $\{S_n; n = 1, 2, \ldots\}$ be a random walk in $\mathbf{R}^d$ and $\mathbf{E}(S_1) = (\mu_1, \ldots, \mu_d)$. Let $a_j > \mu_j$ for $j = 1, \ldots, d$ and $A = (a_1, \infty) \times \cdots \times (a_d, \infty)$. We are interested in the probability $\mathbf{P}(S_n/n \in A)$ for large n in the case where the components of S_1 are heavy tailed. An objective is to associate an exact power with the aforementioned probability. We also derive sharper asymptotic estimates for the probability.

Key words: Heavy tail, large deviation, random walk

Reference:
Nyrhinen, H. (2009). On large deviations of multivariate heavy-tailed random walks. J. Theoret. Probab. 22, 1-17.