

When Does a Randomly Weighted Self-normalized Sum Converge in Distribution?

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Abstract

We determine exactly when a certain randomly weighted, self-normalized sum converges in distribution, partially verifying a 1965 conjecture of Leo Breiman. We, then, apply our results to characterize the asymptotic distribution of relative sums and to provide a short proof of a 1973 conjecture of Logan, Mallows, Rice and Shepp on the asymptotic distribution of self-normalized sums in the case of symmetry.

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Published on: April 16, 2005

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