An Invariance Principle for Triangular Arrays

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Abstract:

Let $A_{n,i}$ be a triangular array of sign-symmetric exchangeable random variables staisfying $nE(A_{n,i}^2) \to 1$, $nE(A_{n,i}^4) \to 0$, $n^2E(A_{n,1}^2 A_{n,2}^2) \to 1$. We show that $\sum_{i=1}^{[nt]} A_{ni}$, $0 \le t \le 1$, converges to Brownian motion. This is applied to show that if A is chosen from the uniform distribution on the orthogonal group O_n and $X_n(t) = \sum_{i=1}^{[nt]} A_{ii}$, then X_n converges to Brownian motion. Similar results hold for the unitary group.