

CLT for linear spectral statistics of normalized sample covariance matrices with larger dimension and small sample size

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Abstract.

Let $A = \frac{1}{\sqrt{np}}(X^T X - pI_n)$ where X is a $p \times n$ matrix, consisting of the independent and identically distributed (*i.i.d.*) real random variables X_{ij} with mean zero and variance one. When $p/n \rightarrow \infty$, under fourth moment conditions the central limit theorem (CLT) for linear spectral statistics (LSS) of A defined by the eigenvalues is established. We also explore its applications in testing whether a population covariance matrix is an identity matrix.