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On asymptotic normality of cross data matrix-based PCA in high dimension low sample size

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Abstract

Principal component analysis in high dimension low sample size setting has been an active research area in recent years. Yata and Aoshima (2010) proposed a cross data matrix-based method and showed the asymptotic normality for estimates of spiked eigenvalues and also consistency for corresponding estimates of PC directions. However, the asymptotic normality for estimates of PC directions is still lacking. In this article, we have extended Yata and Aoshima (2010)'s work to include the investigation of the asymptotic normality for the leading CDM-based PC directions and to compare it with the asymptotic normality for the classical PCA. Numerical examples are provided to illustrate the asymptotic normality.

Keyword: principal component analysis , high dimension, cross data matrix, asymptotic normality