

Sample covariance matrices from "bad populations"

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Recent spectral analysis of large covariance matrices is largely based on the celebrated Marcenko-Pastur law and subsequent applications of the theory to high-dimensional inference involve central limit theorems for the corresponding eigenvalue statistics. However it has recently appeared that there are some important multivariate populations with strongly dependent coordinates for which the existing theories do not apply. High-dimensional mixtures are one of such "bad populations". In this talk, I will describe this phenomenon and then present some alternative results for the case of high-dimensional mixtures.