On estimation of the population spectrum from large dimensional covariance matrices

Jian-feng YAO

The University of Hong Kong, Hong Kong *(jeffyao@hku.hk)*

Abstract:

For large-dimensional data, sample covariance matrices significantly deviate from the population covariance matrix. For various inference problem, it is then crucial to recover population characteristics, e.g. distribution of eigenvalues of the population covariance matrix from the sample covariance matrices. First we will give a review of existing methods for estimation of this distribution. Then recent advances on this topic using contour-integral based methods or extended Stieldjes transform will be presented. In particular advantages and weakness of these methods will be discussed and compared.

In the context of time series, these methods can be applied to series of returns that are widely accepted as uncorrelated in time. The discussed methods are therefore intended to a analysis of the correlation structure within different stock prices.

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