Robust Estimation of Number of Factors in High Dimensional Factor Modeling Via Spearman's Rank Correlation Matrix

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Determining the number of factors in high-dimensional factor modeling is essential but challenging, especially when the data are heavy-tailed. In this paper, we introduce a new estimator based on the spectral properties of Spearman's rank correlation matrix under the high-dimensional setting, where both dimension and sample size tend to infinity proportionally. Our estimator is applicable for scenarios where either the common factors or idiosyncratic errors follow heavy-tailed distributions. We prove that the proposed estimator is consistent under mild conditions. Numerical experiments also demonstrate the superiority of our estimator compared to existing methods, especially for the heavy-tailed case.

References:
[1] Jiaxin Qiu, Zeng Li*, Jianfeng Yao. Robust estimation for number of factors in high dimensional factor modeling via Spearman correlation matrix, Journal of the American Statistical Association, to appear (2024)