Shrinkage estimation from algebraic point of view

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Abstract

In this talk, we consider the estimation of a linearly structured covariance matrix. Our aim is to obtain a structured, positive definite and well-conditioned estimator with good statistical properties, easy and fast to compute. In the first step, we use the least squares method proposed by Ohlson and von Rosen (2010) ([2]). However, the estimator obtained by this method is not always positive definite. Therefore, in order to improve it, we use a modified shrinkage method developed by Ledoit and Wolf (2004) [1]. We derive the estimator formula assuming that the target space is a linear subspace of the structure space and we use the optimization method given by Ledoit and Wolf (2004) [1]. We show that to get an improvement in the estimator, the target subspace should be quadratic.

Keywords

Covariance matrix, Linear structure, Least squares method, Shrinkage method.

References

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