

# A comparison of the estimators of covariance matrix structured by Toeplitz matrix

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## Abstract

The estimation of the covariance matrix plays a key role in the statistical analysis. Determination of a well-conditioned estimator of the covariance matrix with a given structure and good statistical properties can be challenging and time-consuming, especially in the high-dimensional case, where many characteristics are observed. In many cases, the standard estimators of the unstructured covariance matrix are ill-conditioned. Therefore, *shrinkage method* is used along with an appropriately selected loss function.

The purpose of the work is to extend *shrinkage method* to the structured covariance matrix estimation. We focus on a Toeplitz matrix structure. The obtained shrinkage estimators of the covariance matrix are compared with the maximum likelihood estimators in the model, where the data comes from the matrix normal distribution.

## Keywords

Banded Toeplitz matrix, Shrinkage, MLE, Frobenius norm.

## References

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