

CONVEX COVARIANCE MATRIX ESTIMATION AND SPARSITY

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ABSTRACT. In covariance matrix estimation often the challenge is to find a suitable model and an efficient method of estimation. Two popular approaches are to impose linear restrictions on the covariance matrix or on its inverse but linear restrictions on the matrix logarithm of the covariance matrix have been also considered. In this talk I will present a general framework for linear restrictions on various transformations of the covariance matrix. This includes the three examples mentioned above. The proposed estimation method relies on solving a convex problem and leads to an estimator that is asymptotically equivalent to the maximum likelihood estimator of the covariance matrix under the Gaussian assumption. After developing a general theory, we restrict our attention to the case where the linear constraints require certain off-diagonal entries to be zero. Here the geometric picture closely parallels what we know for the Gaussian graphical models.

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