Sparse Matrix Estimation Based on Greedy Algorithms and Information Criteria

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Abstract

We consider the problem of estimating the covariance matrix of serially correlated vectors whose dimension is allowed to be much larger than the sample size. We propose using the orthogonal greedy algorithm (OGA) together with a high-dimensional Akaike's information criterion (HDAIC) to estimate the matrix, and show that the proposed estimate achieves the optimal rate under a sparsity condition more flexible than those in the existing literature. When the covariance matrix is bandable, we use the banding and tapering estimates instead and propose the first information criterion for choosing the banding and tapering parameters that can attain the optimal rate.

Keyword: Covariance estimation, High-dimension, Greedy algorithm, Information criterion, Time series