PhD program in Statistics DSS Statistics Seminar March 28, 2025, 12:00

In person Room 24 (CU002) Webinar https://uniroma1.zoom.us/j/83625004899?pwd=bXCtz0 mp759PUh2lkqT0BUoVa0Uegg.1 Passcode: 123456

Hígh-Dímensíonal Covaríance Estímation vía Sparse Paírwíse Líkelíhood

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Pairwise likelihood offers a practical approximation to the full likelihood function, enabling efficient inference for high-dimensional covariance models by combining marginal bivariate likelihoods. This approach simplifies complex dependencies and retains optimal statistical efficiency in certain models, such as the multivariate normal distribution, where pairwise and full likelihoods are maximized by the same parameter values. We propose a novel method for estimating sparse high-dimensional covariance matrices by maximizing a truncated pairwise likelihood function, which includes only terms corresponding to nonzero covariance elements. Truncation is achieved by minimizing the L2-distance between pairwise and full likelihood scores, coupled with an L1-penalty to exclude uninformative terms. Unlike traditional regularization techniques, our method focuses on selecting entire pairwise likelihood objects rather than shrinking individual parameters, preserving the unbiasedness of the estimating equations. Theoretical analysis demonstrates that the resulting estimator is consistent and achieves the same efficiency as the oracle maximum likelihood estimator, which assumes knowledge of the nonzero covariance structure, even as the dimensionality grows exponentially. Numerical experiments confirm the effectiveness of the proposed approach.



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