The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics and Operations Management

Webinar Announcement

High Dimensional Covariance Matrix Estimation by Penalizing the Matrix-logarithm Transformed Likelihood

by

Dr Anita Wang

Date	:	**3 April 2020 (Friday)**
Time	:	**2:00 pm - 3:15 pm**

Abstract: It is well known that when the dimension of the data becomes very large, the sample covariance matrix S will not be a good estimator of the population covariance matrix Σ. One typical consequence of such is that the estimated eigenvalues from S will be distorted. Many existing methods tried to solve the problem, and examples of which include regularizing Σ by thresholding or banding. In this paper, we estimate Σ by maximizing the likelihood using a new penalization on the matrix logarithm of Σ (denoted by A) of the form $||A - mI||_F^2 = \sum_i (\log(d_i) - m)^2$, where d_i is the ith eigenvalue of Σ. This penalty aims at shrinking the estimated eigenvalues of A toward the mean eigenvalue m. The merits of our method are that it guarantees Σ to be non-negative definite and is computational efficient. The simulation study and applications on portfolio optimization and classification of genomic data show that the proposed method outperforms existing methods.

Bio: Anita WANG Xiaohung received her BSc(Econ) in Renmin University of China (major in statistics) and PhD degree in the University of Hong Kong (major in statistics). She worked in a Asia-top hedge fund as a quantitative analyst for one year. And then worked as an assistant professor in statistics program, BNU-HKBU United International College for three years.

Enquiries: Dept of ISOM