

学术报告会

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Modeling and Identification of Low Rank Stochastic Processes in Large-Scale Systems



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摘要:

Linear stochastic processes are common and important in the field of system science and control theory, appearing in many applications. When a vector linear stochastic process has internal correlations, its underlying process has a rank-deficient spectral density, named low rank stochastic process. Low rank stochastic processes are particularly common in large-scale systems. Because in practice, high-dimensional research objects tend to have complex internal correlations, leading the underlying processes affected by only a few of its entries.

Nowadays, as technologies and research areas rely more and more on a big amount of data, the research on large-scale stochastic processes becomes more important. However, the current research and technical processing of large-scale processes depend heavily on traditional methods for scalars or for processes with a full rank spectral density. This causes the computation cost rises rapidly with the growth of data size, and consumes a large amount of hardware computing resources. Moreover, because of the internal correlations in high-dimensional vector processes, the assumptions of the traditional methods for full rank spectral densities are not satisfied anymore, decreasing the accuracy. There is an urgent demand for a unified theory of low rank stochastic processes to provide a solid theoretical basis for various follow-up studies.

Facing the above requirements, this talk will focus on the mathematical modeling, theoretical properties, identification and estimation of low rank second-order moment vector processes with a rank deficient spectral density.

简介:

Wenqi Cao received the B.E. degree in intelligent science and technology from Nankai University, Tianjin, China, in 2018. She is now a Ph.D candidate in Shanghai Jiao Tong University supported by Zhiyuan Honor Program. And she was a visiting Ph.D student in University of Padova, Padova, Italy and in Tamagawa Academy University, Japan. Her current research interest is control and estimation of low rank linear stochastic systems, with applications in machine learning. Wenqi Cao is a reviewer of IEEE TAC, Automatica, IEEE CDC and so on. She was the winner of Frontrunner 5000 Top Articles in Outstanding S&T Journals of China in 2019.