

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Oleg Burdakov**

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报告题目:

**Global search and sparse optimization  
techniques for solving multilinear  
least-squares problems with application  
to design of filter networks**

邀请人: 袁亚湘研究员

报告时间: **2011年11月15日 (周二)**  
**上午 9: 00-10: 00**

报告地点: **科技综合楼三层 311**  
**计算数学所报告厅**

## **Abstract:**

The multilinear least-squares (MLLS) problem is an extension of the linear least-squares problem. The difference is that a multilinear operator is used in place of a matrix-vector product. The MLLS is typically a large-scale problem characterized by a large number of local minimizers. Each of the local minimizers is singular and non-isolated. The MLLS problem originates, for instance, from the design of filter networks. We present a global search strategy that allows for moving from one local minimizer to a better one. For the design of filter networks, we consider also the problem of finding optimal sparsity of the sub-filters that compose the network. This results in a MLLS problem augmented by an additional constraint that poses an upper limit on the number of nonzero components in the solution. This sparse multilinear least-squares problem is NP-hard. We present an approach for approximately solving the problem. In our numerical experiments, a greedy-type sparse optimization algorithm is used for designing 2D filter networks. The efficiency of these two approaches are illustrated by results of numerical experiments performed for some problems related to the design of filter networks.

欢迎大家参加！