数学与系统科学研究院

计算数学所学术报告

报告人： **Prof. Shiqian Ma**

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报告题目：

New Ranks for Even-Order Tensors and Their Applications in Low-Rank Tensor Optimization

邀请人： 刘歆 博士

报告时间：2015 年 3 月 23 日（周一）

上午 11:00-12:00

报告地点： 科技综合楼三层

311 报告厅

Abstract：

We propose three new tensor decompositions for even-order tensors corresponding respectively to the rank-one decompositions of some unfolded matrices. Consequently such new decompositions lead to three new notions of (even-order) tensor ranks, to be called the M-rank, the symmetric M-rank, and the strongly symmetric M-rank. We discuss the bounds between these new tensor ranks and the CP(CANDECOMP/PARAFAC)-rank and the symmetric CP-rank of an even-order tensor. In particular, we show: (1) these newly defined ranks actually coincide with each other if the even-order tensor in question is super-symmetric; (2) the CP-rank and symmetric CP-rank for a fourth-order tensor can be both lower and upper bounded (up to a constant factor) by the corresponding M-rank. Since the M-rank is much easier to compute than the CP-rank, we can replace the CP-rank by the M-rank in the low-CP-rank tensor recovery model. Numerical results on both synthetic data and real data from colored video completion and decomposition problems show that the M-rank is indeed an effective and easy computable approximation of the CP-rank in the context of low-rank tensor recovery.

欢迎大家参加！