数学与系统科学研究院

计算数学所学术报告

报告人：**Prof. Yin Zhang**

（ Rice University, U.S.A ）

报告题目：

An Efficient Gauss-Newton Algorithm for Symmetric Low-Rank Product Matrix Approximations

邀请人：刘歆 博士

报告时间：**2014** 年 **6** 月 **3** 日（周二）

下午 **15:30-16:30**

报告地点：科技综合楼三层 **311**

计算数学所报告厅

Abstract:

We derive and study a Gauss-Newton method for computing the symmetric low-rank product (SLRP) $XX\zz$, where $X \in\R^{n\times k}$ for $k<n$, that is the closest approximation to a given symmetric matrix $A \in\R^{n\times n}$ in Frobenius norm. When $A=B\zz B$ (or $BB\zz $), this problem essentially reduces to finding a truncated singular value decomposition of B. Our Gauss-Newton method, which has a particularly simple form, shares the same order of iteration-complexity as a gradient method when $k \ll n$, but can be significantly faster on a wide range of problems. In this paper, we prove global convergence and a Q-linear convergence rate for this algorithm, and perform numerical experiments on various test problems, including those from recently active areas of matrix completion and robust principal component analysis. Numerical results show that the proposed algorithm is capable of providing considerable speed advantages over Krylov subspace methods on suitable application problems. Moreover, the algorithm possesses a higher degree of concurrency than Krylov subspace methods, thus offering better scalability on modern multi/many-core computers.

欢迎大家参加！