数学与系统科学研究院

计算数学所学术报告

报告人： **Prof. Yunkai Zhou**

（ Southern Methodist University, USA ）

报告题目：

Large eigenvalue problems: main challenges and new directions

邀请人： 周爱辉 研究员

报告时间：**2014 年 7 月 28 日（周一）**

上午 10:00-11:00

报告地点： 数学院南楼七层 **702**

会议室

Abstract：

The fundamental nature of eigenvalue problems (EVPs) lead to their omnipresence in scientific disciplines. Large EVPs arise naturally in significant fields such as materials science and data mining.

In the first part of the talk, we give a brief overview of large EVPs, survey a few representative algorithms by pointing out their essential common features, and discuss some main challenges for solving large EVPs.

In the second part, we discuss the still perplexing concept of "pre-conditioning" for $Ax=\lambda x$. We present concrete examples to explain that once we focus on the conditioning of the EVPs, instead of focusing on the conditioning of the matrix A or its shifted counterparts $A -\mu I$, then the "pre-conditioning" for EVPs concept can indeed be well-explained and be utilized for designing effective eigen-algorithms. We present some recent advances on the Chebyshev filtered subspace iteration method as successful examples based on our understanding of the "pre-conditioning" concept for EVPs.

Finally, we present a novel spectrum decomposition framework that addresses several difficulties encountered in state-of-the-arts algorithms for solving large EVPs.

欢迎大家参加！