数学与系统科学研究院

计算数学所系列学术报告

报告人：　Prof. Ming-Jun Lai

（ *Department of Mathematics, University of Georgia, Athens, GA 30602. U.S.A.* ）

报告题目：

A short course about compressed sensing and low rank marix completion

邀请人：　许志强 研究员

报告时间：

2018 年 6 月 27 日（周三）上午 9:30-12:30

2018 年 7 月 4 日（周三）上午 9:30-12:30

2018 年 7 月 11 日（周三）上午 9:30-12:30

2018 年 7 月 18 日（周三）上午 9:30-12:30

报告地点：　科技综合楼三层

311 报告厅

Abstract:

I shall survey several computational algorithms based on convex minimization and non-convex minimization approaches for spare solution of underdetermined linear system. In addition, I shall explain a new algorithm called alternating projection method. A convergence analysis will be given. Then I will explain how to use any of these computational algorithms to find graph clustering/communities detection problem. This leads to a single cluster pursuit (SCP) algorithm which can extract one cluster at time. Iteratively, this algorithm can find all the clusters. The computational cost is cheaper than the standard spectral method. It is convenient to deal with unbalanced sizes of clusters. Simulated data sets and real life data sets like Facebook data set and MNIST data will be used to demonstrate the effectiveness and efficiency of the our approach.

After introducing low rank matrix completion problem, I shall first discuss the existence of low rank matrix completion. Then the problem is usually converted to a minimization problem by finding the best approximation matrix from the set of low rank matrices. I shall survey several computational algorithms based on convex minimization and non-convex minimization approaches for matrix completion. I shall explain some detail on the orthogonal rank 1 matrix pursuit algorithm, i.e. its convergence and numerical results. Next I will introduce an alternative projection algorithm to complete the matrix and discuss its convergence. A sufficient condition is proposed to establish the linear convergence of the alternative projection algorithm. We found that with a good initial guess from the orthogonal rank 1 matrix pursuit algorithm, the APA performs very well. Comparison with the well-known singular value thresholding (SVT) algorithm and iteratively reweighted least squares matrix pursuit algorithm will be shown to demonstrate the excellent performance of the APA.

欢迎大家参加！