数学与系统科学研究院

计算数学所学术报告

报告人：　马士谦 博士

（ 美国明尼苏达大学 ）

报告题目：

From Incomplete Data to Decision Making: Structured Convex Optimization Approaches

邀请人：　优化与应用研究中心

报告时间：**2012** 年 **5** 月 **10** 日（周四）

下午 **16：30**

报告地点：　科技综合楼三层 **301**

计算数学所小报告厅

Abstract:

Decision making from incomplete data is a very important topic in Operations Research. Incomplete data occur frequently in different areas in practice. For example, in stock return data from Financial markets, incomplete data occur because there are hidden factors that cannot be observed in the market. Another example is the rating data from online recommendation systems, in which the data are sometimes manipulated by some people in purpose. In this talk, we show that a lot of decision making problems with incomplete data arising from Finance, Statistics and Machine Learning can be formulated as structured convex optimization problems. In particular, we consider the formulations that require the solutions to have sparse or low-rank properties. These problems are usually large-scale with millions of variables and constraints and thus are very challenging to solve. We propose several alternating direction methods that take advantage of the special structures of the problems to solve them. Specifically, we propose alternating linearization methods (ALM) for solving convex optimization problems with two sets of variables. We show that our basic and accelerated ALM need respectively O(1/eps) and O(1/sqrt(eps)) iterations to obtain an eps-optimal solution. To the best of our knowledge, these are the first iteration complexity results that have been given for alternating direction type methods. We then propose alternating proximal gradient method (APGM) that can solve convex optimization problems with three or more sets of variables. We prove that APGM globally converges to an optimal solution under very mild assumptions. Numerical results on problems arising from Finance, Statistics, Machine Learning, Facility Location and Compressed Sensing are shown to demonstrate the efficacy of the proposed approaches.

欢迎大家参加！