

国家数学与交叉科学中心

学术报告

时间: 2017年6月14日 14:30-16:30

地点: N202

报告 I

Time: 14:30-15:30

Title: The Interplay Between Optimization and Data Clustering

Speaker: 彭积明教授, 美国休斯顿大学

Abstract:

Optimization is a branch of applied mathematics dealing with optimizing an objective function subject to a set of constraints over the decision variables. Data clustering is one of the major tasks in data analysis involving segmenting a given data set into several subsets based on a certain similarity/dissimilarity measurement. In this talk, we review some of recent exciting developments on the interaction between optimization and data clustering.

We first show how the well-known K-means clustering problem, the most popular clustering model, can be casted equivalently as a so-called 0-1 semidefinite programming (0-1 SDP). Then we discuss how to design effective algorithm to find an exact or approximate solution to K-means clustering based on 0-1 SDP model and its polynomial solvable convex relaxation.

Second, we consider the so-called ensemble clustering, a popular approach to pursue a better clustering model.

We describe how our exploration in ensemble clustering has inspired us to study sparse solutions in non-convex quadratic optimization, one of the research frontiers in the field of optimization.

If time allows, we shall discuss how to solve the binary matrix factorization (BMF) via new clustering models and techniques and discuss several research challenges in optimization and big data.

报告 II

Time: 15:30-16:30

Title: A Primal Douglas-Rachford Splitting Method for Separable Optimization Problems

Speaker: 韩德仁教授, 南京师范大学

Abstract:

We consider applying the Douglas-Rachford splitting method (DRSM) to the minimization problem with linear constraints and a separable objective function. The dual application of DRSM has been well studied in the literature, resulting in the well known alternating direction method of multipliers (ADMM). In this talk, we show that the primal application of DRSM in combination with an appropriate decomposition can yield an efficient structure-exploiting algorithm for the model under consideration, whose subproblems could be easier than those of ADMM. We present its efficient application to Dantzig Selector and compare it with some other splitting-type methods. Extensions to the multi-block problems are discussed.