国家数学与交叉科学中心

学术报告

Time：3:30-5:30pm，September 6, 2017

Venue：Z311

报告 I

Time：3:30-4:30pm

Title：A Fast Matrix Majorization-Projection Method for Constrained Stress Minimization in MDS

Speaker：Prof. Houduo Qi

University of Southampton

Abstract:

Kruskal's stress minimization, though nonconvex and nonsmooth, has been a major computational model for dissimilarity data in multidimensional scaling.
Semidefinite Programming (SDP) relaxation (by dropping the rank constraint) would lead to a high number of SDP cone constraints.
This has rendered the SDP approach computationally challenging even for problems of small size. In this paper, we reformulate the stress as an Euclidean Distance Matrix (EDM) optimization with box constraints.
A key element in our approach is the conditional positive semidefinite cone with rank cut.
Although nonconvex, this geometric object allows a fast computation of the projection onto it and it naturally leads to a majorization-minimization algorithm with the minimization step having a closed-form solution. Moreover, we prove that our EDM optimization follows a continuously differentiable path, which greatly facilitated the analysis of the convergence to a stationary point.
The superior performance of the proposed algorithm is demonstrated against some of the state-of-the-art solvers in the field of sensor network localization.
* This is a joint work with Xiu Naihua and Zhou Shenglong

报告 II

Time：4:30-5:30pm

Title：Using 0-1 variables to solve global optimization models

Speaker：Prof. Nelson Maculan

Federal University of Rio de Janeiro

Abstract:

We start this presentation with an interesting example of a small global optimization problem. After that we present integer linear models with a polynomial number of variables and constraints for combinatorial optimization problems in graphs: optimum elementary cycles (whose traveling salesman problem), optimum elementary paths even in a graph with negative cycles, and optimum trees (whose Steiner tree problem) problems. Computational results are presented.