

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**L_p -norm regularization
algorithms for optimization over
permutation matrices**

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报告时间: 2015 年 12 月 20 日(周日)

上午 11:00~12:00

报告地点: 科技综合楼三层

311 报告厅

Abstract:

Optimization problems over permutation matrices appear widely in facility layout, chip design, scheduling, pattern recognition, computer vision, graph matching, etc. Since this problem is NP-hard due to the combinatorial nature of permutation matrices, we relax the variable to be the more tractable doubly stochastic matrices and add an L_p -norm ($0 < p < 1$) regularization term to the objective function. The optimal solutions of the L_p -regularized problem are the same as the original problem if the regularization parameter is sufficiently large. A lower bound estimation of the nonzero entries of the stationary points and some connections between the local minimizers and the permutation matrices are further established. Then we propose an L_p regularization algorithm with local refinements. The algorithm approximately solves a sequence of L_p regularization subproblems by the projected gradient method using a nonmontone line search with the Barzilai-Borwein step sizes. Its performance can be further improved if it is combined with certain local search methods, the cutting plane techniques as well as a new negative proximal point scheme. Extensive numerical results on QAPLIB show that our proposed algorithms can often find reasonably high quality solutions within a competitive amount of time.

This is a joint work with Ya-Feng Liu and Zaiwen Wen.

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