数学与系统科学研究院

计算数学所学术报告

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报告时间：　**2010** 年 **8** 月 **1** 日（周日）

上午 **9：00～11：30**

报告地点：　晨兴数学中心

一层 **110** 报告厅

报告题目 1：

On the Complexity of L_p Minimization

Abstract：

We show that the L_p norm (0 < p < 1) minimization

problem, including the smoothed version, arising from sparse solution construction and compressed sensing is both hard and easy. More precisely, for any fixed 0<p<1, we prove that checking the global minimal value of the problem is NP-Hard; but computing a local minimizer of the problem is polynomial-time doable. We also establish lower bounds for the absolute value of nonzero entries in every local optimal solution of the model, which can be used to eliminate zero entries precisely in any numerical solution. Finally, we develop an interior-point algorithm with a provable complexity bound and demonstrate preliminary computational results of effectiveness of the algorithm.

Joint work with Xiaojun Chen, Dongdong Ge, Xiaoye Jiang, and Fengmin Xu

报告题目 2：

A Dynamic Near-Optimal Algorithm for Online Linear Programming

Abstract：

A natural optimization model that formulates many online resource allocation and revenue management problems is

the online linear program (LP) where the constraint matrix is revealed column by column along with the objective function. We provide a near-optimal algorithm for this surprisingly general class of online problems under the assumption of random order of arrival and some mild conditions on the size of the LP right-hand-side input. Our algorithm has a feature of "learning while doing" by dynamically updating a threshold price vector at geometric time intervals, where the dual prices learned from revealed columns in the previous period are used to determine the sequential decisions in the current period. In particular, our algorithm doesn't assume any distribution information on the input itself, thus is robust to data uncertainty and variations due to its dynamic learning capability. Applications of our algorithm include many online multi-resource allocation and multi-product revenue management problems such as online routing and packing, online combinatorial auctions, adwords matching, inventory control and yield management.

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