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：

L2 helps L1 with Global Linear Convergence

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报告时间：**2012** 年 **6** 月 **13** 日（周三）

下午 **15：30-16：30**

报告地点： 科技综合楼三层 **311**

计算数学所报告厅

Abstract:

Minimizing the L1 function of x subject to constraints Ax = b tends to give sparse solutions, and minimizing the squared L2 function gives dense solutions. Surprising or not, minimizing their weighted sum with appropriate weights will still give the L1 solution. In other words, the squared L2 function "smooths" the L1 function but does not change the minimizer. The benefit of adding the squared L2 function is that the resulting problem has a differentiable Lagrange dual problem; hence, a rich set of classical techniques such as gradient descent, line search, Barzilai-Borwein steps, quasi-Newton methods, and Nesterov's acceleration can be directly applied. Moreover, the gradient descent iteration is globally linearly convergent, and we give an explicit rate. This is the first global linear convergence result among the gradient-based algorithms for sparse optimization. We also present an algorithm based on the limited-memory BFGS and demonstrate its superior performance than several existing L1 solvers.

This is joint work with Ming-Jun Lai (U.Georgia at Athens, Math Dept) and Zhimin Peng (Rice U., CAAM Dept)

欢迎大家参加！