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：

Complexity of Unconstrained L_2-L_p Minimization

邀请人：　优化与应用研究中心

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报告地点：　科技综合楼三层 **311**

计算数学所报告厅

Abstract:

We consider the unconstrained L_2-L_p minimization: find a minimizer of $\|Ax-b\|^2_2+\lambda \|x\|^p_p$ for given $A \in R^{m\times n}$, $b\in R^m$ and parameters $\lambda>0$, $p\in [0,1)$. This problem has been studied extensively in variable selection and sparse least squares fitting for high dimensional data. Theoretical results show that the minimizers of the L_2-L_p problem have various attractive features due to the concavity and non-Lipschitzian property of the regularization function $\|\cdot\|^p_p$. In this paper, we show that the L_q-L_p minimization problem is strongly NP-hard for any $p\in [0,1)$ and $q\ge 1$, including its smoothed version. On the other hand, we show that, by choosing parameters (p,λ) carefully, a minimizer, global or local, will have certain desired sparsity. We believe that these results provide new theoretical insights to the studies and applications of the concave regularized optimization problems.

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