数学与系统科学研究院

计算数学所学术报告

报告人：Associate Prof. Yuantao Gu

（ *Dept. EE, Tsinghua Univ.* ）

报告题目：

Sparse signal recovery via non-convex optimization

邀请人： 刘亚锋 博士

报告时间：2015 年 6 月 16 日（周二）

下午 15:30~17:00

报告地点： 科技综合楼三层

311 报告厅

Abstract：

Sparse recovery has been a core topic in various areas of science and engineering including signal processing, machine learning, information theory, medical imaging and computer vision, because the real-world signals of interest often have a sparse representation in some basis. As an intensive field of research, however, there are obstacles need to be overcome. One key issue is to recover the sparse signals from as few observations as possible. Some recent progress shows that adopting non-convex penalty can achieve better performance and save measurements. However, the inherent deficiency of multiple local minima in con-convex optimization limits its practical usage.

In this talk, I will present our recent works on non-convex optimization-based sparse recovery. After a quick survey on Lp minimization, I will first report its local and global optimality and some new properties of its null space constant. Based on the introduction of a class of non-convex sparsity-inducing functions and a quantity to characterize its non-convexity, I will then propose the Projected Generalized Gradient (PGG) method for non-convex function. It will be demonstrated that PGG converges from the initial estimate to a neighborhood of the global optimum with theoretical guarantee. Numerical examples demonstrate the performance of PGG and verify our theoretical analysis.

Short Biography：

Dr. Yuantao Gu is an Associate Professor with Department of Electronic Engineering, Tsinghua University. He received the B.E. degree from Xi'an Jiaotong University in 1998, and the Ph.D. degree (with honor) from Tsinghua University in 2003. He was a visiting scientist at Microsoft Research Asia during 2005 to 2006, and Research Laboratory of Electronics at Massachusetts Institute of Technology (MIT) during 2012 to 2013. His research interests include adaptive filtering, sparse signal recovery, statisical signal processing, and related topics in wireless communications and information networks. Currently, he serves as Associate Editor for IEEE Transactions on Signal Processing and Handling Editor for EURASIP Digital Signal Processing.

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