

数学与系统科学研究院  
计算数学所定期学术报告

报告人: **Associate Prof. YAO Yuan**

( *Hong Kong University of Science and Technology* )

报告题目:

**Linearized Bregman Path  
Algorithms — Statistical Consistency  
and New Applications**

邀请人: 于海军 副研究员

报告时间: **2016 年 11 月 24 日 (周四)**

**下午 16:00-17:00**

报告地点: **数学院思源楼  
一层报告厅**

## **Abstract:**

Estimate or recovery of sparse parameters from their noisy measurements is a fundamental problem in high dimensional statistics and compressed sensing, etc. In the past two decades, convex regularization approach such as LASSO or BPDN has been made popular for its algorithmic tractability. However, a well-known shortcoming of LASSO and any convex regularizations lies in the bias of estimators, which motivates further investigation of nonconvex regularization yet suffering the computational hurdle. Here we bring an idea based on some dynamics developed in applied mathematics to address this challenge in statistics. Such dynamics can be shown to traverse a path passing through the oracle estimator, an unbiased estimate of the true parameter whose entries have the same signs as those of the true signs, while the LASSO regularization path always deviates from that due to its bias. A discretization of the dynamics leads to the Linearized Bregman iteration algorithm, which is a simple iterative thresholding rule and easy to parallelize in favor of big data analysis. This approach adapts to various sparse regularizations, including logistic regression, fused lasso, matrix regression, and graphical models etc. In particular, equipped with variable splitting for structural sparsity, it leads to improved model selection consistency than generalized LASSO in both theory and applications. New application examples will be demonstrated in statistical ranking, social networks, and computational biology etc., together with a new R package — Libra.

This includes joint studies with Chendi Huang, Feng Ruan, Xinwei Sun, Stanley Osher, Jiechao Xiong, and Wotao Yin, et al.

**欢迎大家参加！**