

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Jack Xin**

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报告题目:

**Structured Sparse Representations
with Coherent Dictionaries Based on
Ratio and Difference of L1 and L2
Norms**

邀请人: 周爱辉 研究员

报告时间: **2013 年 3 月 25 日 (周一)**

上午 10:00~11:00

报告地点: **科技综合楼三层 311**

计算数学所报告厅

Abstract:

De-mixing problems in spectroscopic imaging often require finding sparse non-negative linear combinations of library functions to match observed data. Due to misalignment and uncertainty in data measurement, the known library functions may not represent the data as well as their proper deformations. To improve data adaptivity, we expand the library to one with a group structure and impose a structured sparsity constraint so that the coefficients for each group should be sparse or even 1-sparse. Since the expanded library is a highly coherent (redundant) dictionary, it is difficult to obtain good solutions using convex methods such as non-negative least squares (NNLS) or L1 norm minimization. We study efficient non-convex penalties such as the ratio/difference of L1 and L2 norms, as sparsity penalties to be added to the objective in NNLS-type models. We show an exact recovery theory of the sparsest solution by minimizing the ratio/difference norms under a uniformity condition. For solving the related unconstrained non-convex models, we develop a scaled gradient projection algorithm that requires solving a sequence of strongly convex quadratic programs.

欢迎大家参加!