数学与系统科学研究院

计算数学所学术报告

报告人：　Prof. Shiqian Ma

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报告题目：

Structured Nonconvex and Nonsmooth Optimization: Algorithms and Iteration Complexity Analysis

邀请人：　　刘歆 副研究员

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下午 15:30-16:30

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311 报告厅

Abstract:

Nonconvex and nonsmooth optimization problems are frequently encountered in much of statistics, business, science and engineering, but they are not yet widely recognized as a "technology" in the sense of scalability. A reason for this relatively low degree of popularity is the lack of a well developed system of theory and algorithms to support the applications, as is the case for its convex counterpart. In this talk, we aim to take one step in the direction of disciplined nonconvex and nonsmooth optimization. In particular, we consider some constrained nonconvex optimization models in block decision variables, with or without coupled affine constraints. In the case of no coupled constraints, we show a sublinear rate of convergence to an ϵ-stationary solution in the form of variational inequality for a generalized conditional gradient method, where the convergence rate is shown to be dependent on the H\"olderian continuity of the gradient of the smooth part of the objective. For the model with coupled affine constraints, we introduce corresponding ϵ-stationarity conditions, and propose two proximal-type variants of the ADMM to solve such a model, assuming the proximal ADMM updates can be implemented for all the block variables except for the last block, for which either a gradient step or a majorization-minimization step is implemented. We show an iteration complexity bound of $O(1/\epsilon^2)$ to reach an ϵ-stationary solution for both algorithms. Moreover, we show that the same iteration complexity of a proximal BCD method follows immediately. Numerical results are provided to illustrate the efficacy of the proposed algorithms for tensor robust PCA. This is a joint work with Bo Jiang, Tianyi Lin and Shuzhong Zhang.

欢迎大家参加！