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：

An Efficient Inexact Symmetric Gauss-Seidel Based Majorized ADMM for High-Dimensional Convex Composite Conic Programming

邀请人：　优化与应用研究中心

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报告地点：　数学院南楼二层

219 会议室

Abstract:

In this paper, we propose an {\em inexact} multi-block ADMM-type first-order method for solving a class of high-dimensional convex composite conic optimization problems to moderate accuracy. The design of this method combines an inexact 2-block majorized semi-proximal ADMM and the recent advances in the inexact symmetric Gauss-Seidel (sGS) technique for solving a multi-block convex composite quadratic programming whose objective contains a nonsmooth term involving only the first block-variable. One distinctive feature of our proposed method (called sGS-imsPADMM) is that it only needs one cycle of an inexact sGS iteration, instead of an unknown number of cycles, to solve each of the subproblems involved. With some simple and implementable error tolerance criteria, the cost for solving the subproblems can be greatly reduced, and many steps in the forward sweep of each of the sGS iterations can often be skipped, which further contributes to the efficiency of the proposed method. Global convergence as well as the iteration complexity in both the non-ergodic and the ergodic senses are established. Preliminary numerical experiments on a class of high-dimensional linear and convex quadratic SDP problems with a large number of linear equality and inequality constraints are also provided. The results show that for the vast majority of the tested problems, the sGS-imsPADMM is 2 to 3 times faster than the directly extended multi-block ADMM even with the aggressive step length of 1.618, which is more or less the current benchmark among first-order methods for solving multi-block linear and quadratic SDPs though its convergence is not guaranteed.

[This is based on joint work with Liang Chen and Defeng Sun.]

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