



现在位置：首页 > 学术报告

Academy of Mathematics and Systems Science, CAS
Colloquia & Seminars

Speaker:	Doctor Nachuan Xiao,National University of Singapore
Inviter:	Professor Xin Liu
Title:	An Improved Unconstrained Approach for Bilevel Optimization
Language:	Chinese
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Abstract:	We focus on the nonconvex-strongly-convex bilevel optimization problem (BLO). In this BLO, the objective function of the upper-level problem is nonconvex and possibly nonsmooth, and the lower-level problem is smooth and strongly convex with respect to the underlying variable y. We show that the feasible region of BLO is a Riemannian manifold. Then we transform BLO to its corresponding unconstrained constraint dissolving problem (CDB), whose objective function is explicitly formulated from the objective functions in BLO. We prove that BLO is equivalent to the unconstrained optimization problem CDB. Therefore, various efficient unconstrained approaches, together with their theoretical results, can be directly applied to BLO through CDB. We propose a unified framework for developing subgradient-based methods for CDB. Remarkably, we show that several existing efficient algorithms can fit the unified framework and be interpreted as descent algorithms for CDB. These examples further demonstrate the great potential of our proposed approach.

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