数学与系统科学研究院

计算数学所网络学术报告

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报告题目：

Single-loop Optimization Algorithms for Nonconvex Minimax Optimization Problems and Their Complexity Analysis

邀请人： 戴彧虹 研究员

报告时间：2021 年 7 月 20 日（周二）

下午 15:00-16:00

报告工具：腾讯会议 ID：（936 188 198）

入会密码：1234

线下会场： 数学院南楼 702 教室

Abstract：

Much recent research effort has been directed to the development of efficient algorithms for solving minimax problems with theoretical convergence guarantees due to the relevance of these problems to a few emergent applications. In this paper, we propose a unified single-loop alternating gradient projection (AGP) algorithm for solving nonconvex-(strongly) concave and (strongly) convex-nonconcave minimax problems. AGP employs simple gradient projection steps for updating the primal and dual variables alternatively at each iteration. We show that it can find an ε-stationary point of the objective function in $\mathcal{O}\left(\varepsilon ^{-2} \right)$ (resp. $\mathcal{O}\left(\varepsilon ^{-4} \right)$) iterations under nonconvex-strongly concave (resp. nonconvex-concave) setting. Moreover, its gradient complexity to obtain an ε-stationary point of the objective function is bounded by $\mathcal{O}\left(\varepsilon ^{-2} \right)$ (resp., $\mathcal{O}\left(\varepsilon ^{-4} \right)$) under the strongly convex-nonconcave (resp., convex-nonconcave) setting. To the best of our knowledge, this is the first time that a simple and unified single-loop algorithm is developed for solving both nonconvex-(strongly) concave and (strongly) convex-nonconcave minimax problems. Moreover, the complexity results for solving the latter (strongly) convex-nonconcave minimax problems have never been obtained before in the literature.

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