



復旦大學
FUDAN UNIVERSITY

Applied Math Ph.D. Seminar

First-Order Bilevel Optimization: Computability, Lower Bounds, and Near-Optimal Algorithms

Speaker: Lesi Chen (Tsinghua University)

Time: 2026-05-14, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Jingzhao Zhang (Tsinghua University)

Abstract: This report presents a series of works focusing on first-order bilevel optimization, specifically examining their computability, lower complexity bounds, and the development of near-optimal algorithms across various settings. The content is organized into three primary contributions: (1) In the first part of this report, we start by discussing which classes of problems have computable stationary points even in infinite dimensions and which do not. Specifically, while finding a stationary point is widely known to be tractable for nonconvex-strongly-convex (NC-SC) problems, we demonstrate that it can become intractable in the absence of lower-level strong convexity. (2) In the second part, we establish lower complexity bounds for all first-order algorithms to find stationary points of NC-SC problems. (3) Finally, we introduce how to design efficient algorithms to reach these lower bounds under both the deterministic and stochastic settings, respectively.