



复旦大学数学科学学院 数学综合报告会

报告题目: Cutoff Mean-Field Control and Reflected Free Boundaries in Optimal Losses Allocation for Systemic Risk Modeling

报告人: 郭宇城 (Princeton University)

报告时间: 2026 年 9 月 24 日星期四, 16: 30—17: 30

报告地点: 光华楼东主楼 2001 室

报告摘要: We study a singular mean-field control problem motivated by systemic risk, in which a central planner allocates losses from defaults to maximize a concave measure of the system's terminal health. We prove that the optimal allocation follows a cutoff rule, or "taxing-the-richest" policy, by solving a time-discretized problem and passing to the continuous-time limit. We then characterize the resulting optimal flow through a novel reflected free-boundary problem and establish well-posedness in a probabilistic solution class. The main technical difficulty lies in the dependence of the optimal feedback control on a quantile-type moving boundary, which is unstable under standard convergence of probability laws; we address it through stochastic-order arguments, compactness estimates for the cutoff boundaries, and an augmented call-function formulation of the dynamics. Joint work with Qinxin Yan.

非线性数学模型与方法教育部重点实验室
中法应用数学国际联合实验室
上海市现代应用数学重点实验室
复旦大学数学研究所