学术报告

题　　目：Mechanism Design for Exchange Market

报告人：程郁琨 教授，江南大学

时　　间：12 月 12 日（星期四）　下午 15:00 – 16:00

地　　点：数学院南楼 613

摘　　要：Exchange markets are a significant type of market economy, in which each agent holds a budget and certain (divisible) resources available for trading. Most research on equilibrium in exchange economies is based on an environment of completely free competition. However, the orderly operation of markets in reality also relies on effective economic regulatory mechanisms. This talk initiates the study of the mechanism design problem in exchange markets, exploring the potential to establish truthful market rules and mechanisms. This task poses a significant challenge as unlike auctioneers in auction design, the mechanism designer in exchange markets lacks centralized authority to fully control the allocation of resources.

　　In the talk, we model market mechanism design. The problem is formalized as a two-stage game. In stage 1, agents submit their private information to the manager, who then formulates market trading rules based on the submitted information. In stage 2, agents are free to engage in transactions within these rules, ultimately reaching an equilibrium. We generalize the concept of liquid welfare from classical budget-feasible auctions and use market liquid welfare as a measure to evaluate the performance of the designed mechanism. Moreover, an extra concept called profitability is introduced to assess whether the market is money-making (profitable) or money-losing (unprofitable). Our goal is to design a truthful mechanism for the market manager that achieves an (approximate) optimal welfare while minimizing unprofitability as much as possible. We propose

two mechanisms for the problem. The first one guarantees truthfulness and profitability while approaching an approximation ratio of approximately 1/2 in large markets. The second one is truthful and achieves 1/2 approximation in general markets but incurs bounded unprofitability. Our aim is for both mechanisms to provide valuable insights into the truthful market design problem.

个人简介：程郁琨：博士，博士生导师，江南大学商学院教授。《运筹学学报》、《Blockchain》等期刊编委，中国运筹学会理事兼副秘书长，中国工业与应用数学学会区块链专委会秘书长、中国运筹学会数学规划分会理事，中国计算机学会计算经济学专业组副主任，江苏省运筹学会理事。主要研究领域为信息经济学、算法博弈论、组合优化，区块链技术与应用等。2010-2013 年期间，在浙江大学从事博士后研究工作。2012-2013 年，获国家留学基金委资助赴澳大利亚墨尔本大学访问。主持国家自然科学基金项目 4 项，在运筹学领域国际顶级刊物 MOR，计算机科学领域重要国际期刊 IEEE TCC、IEEE TC、TCS，计算经济学领域国际顶级会议 EC2022、WINE2017、2024，区块链领域顶级国际会议 FC 2022，人工智能领域顶级会议 IJCAI2016 上发表高水平学术论文 70 余篇。江苏省高校"青蓝工程"中青年学术带头人，江苏省高校"青蓝工程"优秀青年骨干教师。获得 2021 年度江苏省高等学校科学技术研究成果奖三等奖等奖项，获得发明专利 2 项。