中国科学院数学与系统科学研究院
Academy of Mathematics and Systems Science, CAS

运筹学与信息科学研究室
Department of Operations Research and Information Science

学术报告

题　目：An Accelerated Proximal Alternating Direction Method of Multipliers for Optimal Decentralized Control of Uncertain Systems

报告人：赵欣苑 教授，北京工业大学

时　间：4 月 24 日（星期三）10:00 – 11:00

地　点：思源楼 615

摘　要：To ensure the system stability of the H2-guaranteed cost optimal decentralized control problem (ODC), an approximate semidefinite programming (SDP) problem is formulated based on the sparsity of the gain matrix of the decentralized controller. To reduce data storage and improve computational efficiency, the SDP problem is vectorized into a conic programming (CP) problem using the Kronecker product. Then, a proximal alternating direction method of multipliers (PADMM) is proposed to solve the dual of the resulted CP. By linking the (generalized) PADMM with the (relaxed) proximal point algorithm, we are able to accelerate the proposed PADMM via the Halpern fixed-point iterative scheme. This results in a fast convergence rate for the Karush-Kuhn-Tucker (KKT) residual along the sequence generated by the accelerated algorithm. Numerical experiments further demonstrate that the accelerated PADMM outperforms both the well-known CVXOPT and SCS algorithms for solving the large-scale CP problems arising from H2-guaranteed cost ODC problems.

报告人简介：赵欣苑，北京工业大学数学、统计学与力学学院教授、博导。2009 年在新加坡国立大学数学系获博士学位。主要研究兴趣：1. 大规模矩阵优化问题的理论、算法及应用 2. 数据驱动的工程优化问题的智能算法 3. 高效优化求解器的软件研发。主持和参与多项国家基金委项目、北京市教委项目及多个企业合作项目，如华为、国家管网集团和北京公交一卡通公司等。研究成果主要发表在《中国科学•数学》、SIAM OPT、OMS、AAAI 等国内外期刊和会议上，是大规模半定规划求解器 SDPNAL/SDPNAL+ 主要开发成员。2022 年，赵欣苑教授及其研发团队荣获《中国运筹学会科学技术奖•运筹应用奖》。目前的学术兼职有中国运筹学会数学规划分会副秘书长及常务理事，北京市运筹学会理事、《亚太运筹学杂志（APJOR）》编委。