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： **Global and Local Convergence-Rate Analysis of an Inexact Newton Augmented Lagrangian Method for Zero-One Composite Optimization**

报告人： 戚厚铎 教授，香港理工大学

时　　间： **3 月 24 日（星期五） 15:45 – 16:45**

地　　点： **数学院南楼 N226**

摘　　要： Zero-One Composite Optimization (0/1-COP) is a prototype of nonsmooth, non-convex optimization problems and it has attracted much attention recently. Augmented Lagrangian Method (ALM) has stood out as a leading methodology for such problems. The main purpose of this paper is to extend the classical theory of ALM fromsmooth problems to 0/1-COP. We propose, for the first time, second-order optimality conditions for 0/1-COP. In particular, under a second-order sufficient condition (SOSC), we prove Q-linear convergence rate of the proposed ALM. In order to identify the subspace used in SOSC, we employ the proximal operator of the 0/1-loss function, leading to an active-set identification technique. Built around this identification process, we design practical stopping criteria for any algorithm to be used for the subproblem of ALM. We justify that Newton's method is an ideal candidate for the subproblem and it enjoys both global and quadratic convergence. Those considerations result in an inexact Newton ALM (iNALM) for 0/1-COP. The method of iNALM is unique in the sense that it is active-set based, it is inexact (hence more practical), and SOSC instead of widely assumed Kurdyka-Lojasiewicz (KL) properties plays an important in its R-linear convergence analysis. The numerical results on both simulated and real datasets show the fast running speed and high accuracy of iNALM when compared with several leading solvers (Joint work with Xiu Naihua and Zhang Penghe).

报告人简介： 戚厚铎教授目前担任香港理工大学的教授。在此之前，他担任英国南安普顿大学的优化教授，1996 年于中国科学院获得博士学位。目前的研究兴趣包括数据科学中的距离矩阵优化问题，稀疏优化，以及多样化的投资组合优化。戚厚铎教授被 Australian Research Council 授予伊丽莎白二世女王奖学金（QEII Fellow）（2003 年），于 2019 年被英国国家数据科学研究所 Alan Turing Institute 授予 Turing Fellow。他目前是《Asia-Pacific Journal of Operational Research》的领域主编（优化），《Mathematical Programming Computation》、《Journal of Operations Research Society of China》和《Computational Optimization and Applications》的副主编。