上海交通大学自动化系
Department of Automation
Shanghai Jiao Tong University

系统控制与信息处理教育部重点实验室
Key Laboratory of System Control and Information Processing, Ministry of Education

学术报告会

时间：2013年9月5日(周四)13:30

地点：电院群楼2-410会议室

Decentralized Integral Controllability Analysis Based on a New Unconditional Stability Criterion

Dr. Steven Su (苏卫东)

University of Technology, Sydney (UTS), Australia

Abstract:

Decentralized integral control is one of the most popular control strategies used in practice. An important issue associated with this strategy is the analysis of Decentralized Integral Controllability (DIC). Campo and Morari showed that for a given process, if its steady state gain matrix is not critically D-stable, its DIC can be determined by using its steady state gain matrix. This study investigates decentralized integral control with a special focus on the DIC analysis of processes whose steady state gain matrices are critically D-stable. Firstly, this study proposes a new unconditional stability criterion. Then, by using the proposed criterion, it is proved that for up to four-channel processes, their DIC can be totally determined by their steady state gain matrices. We also present a multi-loop PI control design method, which provides an explicit lower bound of the proportional coefficient to achieve decentralized unconditional stability for low dimensional processes. This study presents a six-channel process whose DIC property cannot be determined only by its steady state gain matrix.

Biography:

Steven Su received the B.S. and M.S. degrees from Harbin Institute of Technology (HIT), Harbin, China, in 1990 and 1993, respectively. He received the Ph.D. degree from the Research School of Information Sciences and Engineering (RSISE), the Australian National University (ANU), Canberra, Australia, in 2002. He was a postdoctoral research fellow in School of Chemical Engineering and Industrial Chemistry, the University of New South Wales (UNSW) from 2002 to 2004. He was also served as a Research Fellow in School of Electrical Engineering and Telecommunications, the University of New South Wales, Sydney, Australia, from 2004 to 2006. He is currently a Senior Lecturer with the School of Electrical, Mechanical and Mechatronic Systems, the Faculty of Engineering, University of Technology, Sydney (UTS). Dr. Su has been engaged in the research areas of decentralized control, fault tolerant control and biomedical system modelling and control, and has published over one hundred refereed research papers. Dr. Su has been the editorial member of Journal of Intelligent Learning Systems and Applications, and served as the associate editor of Australian Control Conference. His current research interests include biomedical system modelling and control, decentralized fault tolerant control, and navigation system design.