

WORKING AND LITERATURE SEMINAR

Topic: Cooperative Control of Multi-agent Systems: A Distributed Observer Approach

Speaker: Jie Huang, The Chinese University of Hong Kong

Time: 16:00 - 17:00, 5 May 2014

Venue: Room 379, Geography Building, 3663 Zhongshan Road North, Shanghai
(华东师范大学中山北路校区, 地理楼 379 室)

ABSTRACT

The cooperative control of multi-agent systems includes but is not limited to such problems as consensus/synchronization, formation, rendezvous, flocking, and swarming. These problems arise from such applications as the coordination of mobile robots, mobile sensor networks, formation of unmanned flight vehicles, etc. The past decade has witnessed a tremendous expansion on the research of multi-agent control systems. However, so far most results are limited to homogeneous linear systems without subjecting to uncertainties and external disturbances. In this talk, we will first point out the connection between several cooperative control problems of multi-agent systems and the classical output regulation problem. Then we will present a unified framework for handling several cooperative control problems for nonlinear multi-agent systems. The core of this framework is the establishment of the distributed observer which can be viewed as the distributed counterpart of the feedforward control approach to handling the classical output regulation problem. A direct application of this framework will lead to the solution of the cooperative output regulation problem in an uncertain multi-agent system. Moreover, this framework also contains several cooperative control problems of multi-agent systems such as consensus, synchronization, flocking, and formation as special cases.

BIOGRAPHY

Jie Huang is professor and chairman of the Department of Mechanical and Automation Engineering, the Chinese University of Hong Kong. His research interests include automatic control, robotics and automation, systems biology, and guidance and control of flight vehicles. He authored three monographs and about 300 papers. He received China State Natural Science Award, Class II, in 2010, Croucher Senior Research Fellowship award in 2006, the SUPCON Best Paper Award of the 9th World Congress on Intelligent Control and Automation in 2012 and the best paper award of the Eighth International Conference on Control, Automation, Robotics, and Vision in 2004. He was elected CAA Fellow in 2010, IFAC Fellow in 2008, and IEEE Fellow in 2004.

Jie Huang is / was associate editor, subject editor, guest editor, or editor-in-large of over 10 journals. He was Distinguished Lecturer of IEEE Control Systems Society from 2005 to 2008, a member of the Board of Governors of IEEE Control Systems Society from 2006 to 2007. He served as a Science Advisor to the Leisure and Cultural Services Department of Hong Kong Special Administrative Region, and Honorary Advisor to Hong Kong Science Museum. He received his Ph.D. degree in automatic control from the Johns Hopkins University in 1990.