

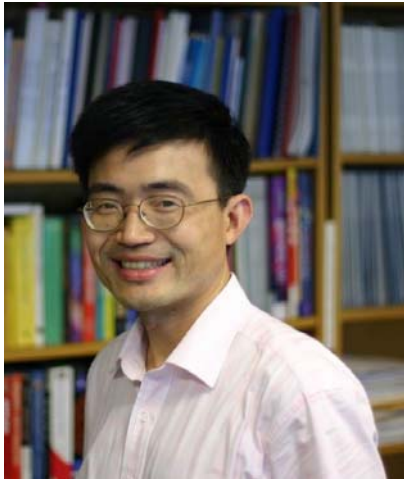
The 31st Chinese Control Conference

Pre-conference Workshop 2

Title: Advanced Applied Nonlinear Control: Opportunities and Challenges

Speaker: Zhong-Ping Jiang, Polytechnic Institute of New York University, U.S.A.

Abstract: There has been a phenomenal progress in nonlinear control theory and applications over the last 30 years. The field of nonlinear control continues to remain an active research branch of automatic control, because of the fact that control systems arising from real-world applications are essentially nonlinear and often involve strong nonlinearities. A rich set of tools for analyzing nonlinear systems and designing controllers with guaranteed robustness and desirable performance are scattered throughout the vast literature. The objective of the half-day workshop is to present an overview of recent developments in constructive nonlinear control, in a pedagogical way. With this in mind, the workshop consists of three parts. Part 1 is devoted to the introduction of benchmark examples and exciting applications in nonlinear control. Part 2 will then introduce two basic and powerful tools, input-to-state stability and small-gain methods, that have played a key role in solving various kinds of nonlinear control problems. Examples of these problems include stabilization, adaptive tracking, decentralized control for nonlinear dynamic systems taking either continuous-time or discrete-time forms and involving probably impulsive effects and time delays. Their applications also appear in recent studies on hot topics such as networked control systems (NCS), cooperative control of multi-agents, hybrid systems, and systems and mathematical biology. We will briefly discuss some of our recent research findings in Part 3.



Zhong-Ping JIANG (M'94, SM'02, F'08) received the B.Sc. degree in mathematics from the University of Wuhan, Wuhan, China, in 1988, the M.Sc. degree in statistics from the University of Paris XI, France, in 1989, and the Ph.D. degree in automatic control and mathematics from the Ecole des Mines de Paris, France, in 1993.

Currently, Dr. Jiang is a Full Professor of Electrical and Computer Engineering at the Polytechnic Institute of NYU, and a Changjiang Chair Professor at Beijing University. His areas of research interest include stability theory, robust/adaptive nonlinear control with applications to information, mechanical and biological networks. He is a author of seven book chapters, over 100 journal papers and numerous conference papers. He is coauthor of the book *Stability and Stabilization of Nonlinear Systems* (with I. Karafyllis, Springer 2011).

An IEEE Fellow, Dr. Jiang has served as a Subject Editor for the *International Journal of Robust and Nonlinear Control*, and as an Associate Editor for several journals including *Systems & Control Letters*, *IEEE Transactions on Automatic Control*, *European Journal of Control* and *J. Control Theory and Applications*. Dr. Jiang is a recipient of the prestigious Queen Elizabeth II Fellowship Award from the Australian Research Council, the CAREER Award from the U.S. National Science Foundation, and the Young Investigator Award from the NSF of China. He received the Best Theory Paper Award (with coauthor Y. Wang) at the 2008 World Congress on Intelligent Control and Automation, and, with coauthors T. Liu and D. J. Hill, the Guan Zhao Zhi Best Paper Award at the 2011 Chinese Control Conference.