

The 31st Chinese Control Conference

Pre-conference Workshop 1

Title: Data-based Control and Optimization for Nonlinear Systems

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Abstract: In modern industries such as manufacturing, transportation, and logistics, vast amounts of data are being produced each day. There are urgent needs for developing new control, decision, scheduling, and fault diagnosis methods that utilize the vast amounts of data for the increasingly complex and large-scale industrial processes and equipments. Instead of relying primarily on models obtained from physical laws, we must now combine control theory/systems engineering with data mining, pattern recognition, and parallel computer simulation. Recent progress in this direction has resulted in some data-centric technologies, called data-driven methodologies or data-based approaches. This lecture will introduce the basic concept and the most recent development in this area including control and optimization for nonlinear systems using data-based approaches.



Derong Liu received the Ph.D. degree in electrical engineering from the University of Notre Dame, Notre Dame, IN, in 1994. Dr. Liu was a Staff Fellow with General Motors Research and Development Center, Warren, MI, from 1993 to 1995. He was an Assistant Professor in the Department of Electrical and Computer Engineering, Stevens Institute of Technology, Hoboken, NJ, from 1995 to 1999. He joined the University of Illinois at Chicago in 1999, and became a Full Professor of electrical and computer engineering and of computer science in 2006. He was selected for the "100 Talents Program" by the Chinese Academy of Sciences in 2008. He has published 10 books.

Dr. Liu was an Associate Editor of *Automatica* (2006-2009). He serves as an Associate Editor of *Neurocomputing* and the *International Journal of Neural Systems*. He was an Associate Editor of the *IEEE Transactions on Circuits and Systems-I: Fundamental Theory and Applications* (1997-1999), the *IEEE Transactions on Signal Processing* (2001-2003), the *IEEE Transactions on Neural Networks* (2004-2009), the *IEEE Computational Intelligence Magazine* (2006-2009), and the *IEEE Circuits and Systems Magazine* (2008-2009), and the Letters Editor of the *IEEE Transactions on Neural Networks* (2006-2008). Currently, he is the Editor-in-Chief of the *IEEE Transactions on Neural Networks* and an Associate Editor of the *IEEE Transactions on Control Systems Technology*.

He received the Michael J. Birck Fellowship from the University of Notre Dame (1990), the Harvey N. Davis Distinguished Teaching Award from Stevens Institute of Technology (1997), the Faculty Early Career Development (CAREER) Award from the National Science Foundation (1999), the University Scholar Award from University of Illinois (2006), and the Overseas Outstanding Young Scholar Award from the National Natural Science Foundation of China (2008). He is a Fellow of the IEEE.