

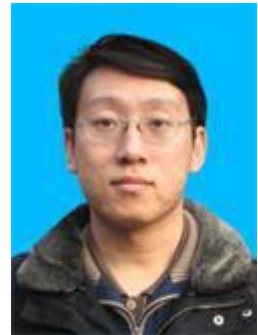
学术报告会

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Communication and control in multi-agent systems

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Abstract:

In recent years, along with the rapid development of micro-sensors, electromechanical systems and communication networks, there are fundamental changes in the basic architecture and operating mechanism of control systems. The units of a control system are not those with only single functions such as plants, sensors and controllers any longer, but autonomous agents with integrated capability of sensing, decision-making, actuating and communication. Agents communicate and cooperate with each other to accomplish given tasks through various types of communication networks. Communication constraints become crucially important for the whole system, and the integrative design of communication mechanism and cooperative control law becomes interesting. In this talk, we consider distributed coordination of multi-agent systems with finite communication data rate. We propose dynamic encoding-decoding schemes with finite-level quantization and vanishing scaling functions. The cooperative control law is designed based on that for precise communication and the Certainty Equivalence principle. Small channel capacity theorems for distributed averaging are established, which show that for connected networks, there exist lower bounds of the data rate, independent of the number of nodes, to ensure exponentially fast convergence to exact average-consensus.

Biography:

Tao Li (李韬) received the B.E. degree in automation from Nankai University, Tianjin, in 2004, and the Ph.D. degree in systems theory from the Academy of Mathematics and Systems Science (AMSS), Chinese Academy of Sciences (CAS), Beijing, China, in 2009. From July 2009 to December 2013, he was a faculty member of AMSS, CAS. He was awarded Distinguished Dongfang Professorship by Shanghai Municipality in December, 2012. Since December 2013, he has been with the School of Mechatronic and Automation, Shanghai University, Shanghai, China, where now he is a professor. Dr. Li's current research interests include stochastic systems, networked control, multi-agent systems and sensor networks. Dr. Li was mentioned as one of the five finalists for the Young Author Prize of the 17th IFAC World Congress, Seoul, 2008. He received the Special President Prize of Chinese Academy of Sciences in 2009, the Best Paper Award of the 7th Asian Control Conference with coauthors in 2009, the 2009 Singapore Millennium Foundation Research Fellowship and the 2010 Endeavour Research Fellowship from Australian government. He is a member of the Youth Innovation Promotion Association, CAS. He is currently an editorial board member of Mathematical Problems in Engineering and Journal of Systems Science and Mathematical Sciences. Dr. Li has been an IEEE Senior Member since September, 2014.