**西南交通大学**

**“创源”大讲堂研究生**

**学术讲座**

**报告题目**：Autonomous Synchronization of Heterogeneous Multi-Agent Systems

**报告人**：陈智勇 教授

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**主持人：**张吉烈、张宏伟

**Zhiyong Chen** received the B.E. degree from the University of Science and Technology of China, and the M.Phil. and Ph.D. degrees from the Chinese University of Hong Kong, in 2000, 2002 and 2005, respectively. He worked as a Research Associate at the University of Virginia during 2005-2006. He joined the University of Newcastle, Australia, in 2006, where he is currently a Professor and Head of School of Electrical Engineering and Computing. He was a Changjiang Chair Professor with Central South University, Changsha, China. His research interests include non-linear systems and control, biological systems, and multi-agent systems. He is/was an associate editor of Automatica, IEEE Transactions on Automatic Control and IEEE Transactions on Cybernetics.

**讲座内容简介:** In this talk, we will introduce a new type of synchronization problem for heterogeneous multi-agent systems (MASs), called autonomous synchronization. In this problem, neither the synchronized agent dynamics nor the synchronized states are specified a priori, instead, they are autonomously determined by the inherent properties and the initial states of agents, thus providing an MAS with more degrees of adaptability and higher synchronization efficiency. To achieve autonomous synchronization, a novel dynamics update law and a synchronizing control law are proposed and the sufficient solvability conditions are explicitly revealed in both continuous-time and discrete-time settings. Moreover, in the continuous-time setting, a core technical problem is the so-called asymptotic decoupling of stable modes for a linear time varying system containing stable and unstable modes. The necessary and sufficient conditions are derived for this problem based on the newly developed techniques for analyzing matrix exponential and state transition matrix.

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