SEMINAR SERIES

北京大学工学院 力学与工程科学系

湍流与复杂系统国家重点实验室

From consensus to emergence of new behavior of multi-agent system

报告人 Prof. Hyungbo Shim

Seoul National University, Korea

主持人：李忠奎 孙志勇

时 间：11 月 7 日（周四）上午 9:00

地 点：新奥工学大楼 1050 会议室

报告摘要：

Consensus or synchronization of networked dynamical systems attracted a lot of attention over the past twenty years in our control community. In this talk, we begin with a brief history of consensus research with the goal of presenting how consensus of heterogeneous multi-agent system give rise to emergent behavior in a concrete manner. We also talk about how to leverage the new emergent behavior in many engineering problems such as distributed state estimation, distributed optimization, and robustification of multi-agent systems.

报告人简介：

Hyungbo Shim received his B.S., M.S., and Ph.D. degrees from Seoul National University, Korea, and held a post-doctoral position at the University of California, Santa Barbara until 2001. He joined Hanyang University in Seoul in 2002. Since 2003, he has been with Seoul National University, Korea. He has served as an associate editor for Automatica, IEEE Transactions on Automatic Control, International Journal of Robust and Nonlinear Control, and European Journal of Control, as well as an editor for International Journal of Control, Automation, and Systems. He is serving as the general chair for IFAC World Congress 2026.

His research interests include stability analysis of nonlinear systems, observer design, disturbance observer, secure control systems, and synchronization in multi-agent systems. He is a Fellow of ICROS, Senior Member of IEEE, and a member of Korean Academy of Science and Technology.

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Distributed Formation Control Inspired from Collective Behaviors

报告人 Prof. Hyo-Sung Ahn

Gwangju Institute of Science and Technology (GIST), Korea

主持人：孙志勇 李忠奎

时 间：11 月 7 日（周四）上午 10:00

地 点：新奥工学大楼 1050 会议室

报告摘要：

The distributed formation control laws use relative information defined in local coordinate frames; thus, from a sensing perspective, the formation control laws are fully distributed. The formation control laws have been mainly used for the control of multi-agent systems, including coordination of a group of mobile agents, formation flying of UAVs, platooning of a group of autonomous vehicles, and rendezvous of spacecrafts. From the perspective that the distributed formation control uses local relative measurements for the control of agents, it could be conjectured that the distributed formation control imitates the feature of collective animal motions. After briefly reviewing the collective behaviors of biological systems, distributed formation control laws are mathematically refined to show how they are related to the animal's sensing mechanisms.

报告人简介：

Hyo-Sung Ahn received the B.S. and M.S. degrees in astronomy from Yonsei University, Seoul, South Korea, in 1998 and 2000, respectively, the M.S. degree in electrical engineering from the University of North Dakota, Grand Forks, ND, USA, in 2003, and the Ph.D. degree in electrical engineering from Utah State University, Logan, UT, USA, in 2006. Since July 2007, he has been with the School of Mechatronics and the School of Mechanical Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, South Korea. He was a Dasan Distinguished Professor (Dasan Professor), from 2013 to 2018. He is currently a Professor with the School of Mechanical and Robotics Engineering, GIST.

Dr. Ahn is a Fellow of ICROS and Senior Member of IEEE, and he is serving as an Editor-in-Chief of International Journal of Control, Automation, and Systems. He is the author of the books Iterative Learning Control: Robustness and Monotonic Convergence for Interval Systems (Springer, 2007), Formation Control: Approaches for Distributed Agents (Springer, 2020), and a co-author of the book Control of Multi-agent Systems: Theory and Simulation with Python (Springer, 2024). He is the recipient of the Presidential Commendation of Korea (2024). His research interests include distributed control, aerospace navigation and control, network localization, and learning control.

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