USC Viterbi School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Seminar

Nonlinear Small-Gain Theory for Networks and Control

Speaker: Zhong-Ping Jiang, Professor, New York University

Tuesday, May 30th, 2023
11:00 AM – 12:00 PM
Location: EEB 132

Zoom: https://usc.zoom.us/j/99411640901?pwd=SjBXZmFjTis3QUZVK3EvOS9ialNWUT09
Meeting ID: 994 1164 0901 **Passcode:** 343620

Abstract: The world is nonlinear and linked. Small-gain theory is one of the most important tools to tackle fundamentally challenging control problems for interconnected nonlinear systems. In this talk, I will first review early developments in nonlinear small-gain theorems and associated nonlinear control design and show how it served as a basic tool to unify numerous results in constructive nonlinear control. Then, I will present recent developments in network/cyclic small-gain theorems for complex large-scale nonlinear systems, with applications to networked and event-triggered control under communications and computation constraints. Finally, I will discuss briefly how machine learning techniques can be invoked to relax the conservativeness of small-gain designs, that falls into the emerging area of learning-based control, a new direction in control theory.

Bio: Zhong-Ping JIANG received 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 *ParisTech-Mines* (formerly called the Ecole des Mines de Paris), France, in 1993, under the direction of Prof. Laurent Praly.

Currently, he is a Professor of Electrical and Computer Engineering at the Tandon School of Engineering, New York University. His main research interests include stability theory, robust/adaptive/distributed nonlinear control, robust adaptive dynamic programming, reinforcement learning and their applications to information, mechanical and biological systems. In these fields, he has written six books and is the author/co-author of over 500 peer-reviewed journal and conference papers. Prof. Jiang is a recipient of the prestigious Queen Elizabeth II Fellowship Award from the Australian Research Council, CAREER Award from the U.S. National Science Foundation, JSPS Invitation Fellowship from the Japan Society for the Promotion of Science, Distinguished Overseas Chinese Scholar Award from the NSF of China, and several best paper awards. He has served as Deputy Editor-in-Chief, Senior Editor and Associate Editor for numerous journals. Prof. Jiang is a Fellow of the IEEE, IFAC, CAA and AAIA, a foreign member of the Academia Europaea (Academy of Europe) and is among the Clarivate Analytics Highly Cited Researchers. In 2022, he received the Excellence in Research Award from the NYU Tandon School of Engineering.

Hosts: Dr. Petros Ioannou, ioannou@usc.edu