

KIOS Distinguished Lecture Series



Prof. Zhong-Ping Jiang

New York University, USA

Friday, 10 January 2025, at 11:00 | Amphitheatre B108

Learning-Based Control: A New Direction in Control Theory

LECTURE ABSTRACT

Model-based control has played a vital role in many branches of engineering and sciences. The purpose of this talk is to present a different paradigm for control systems design. Instead of designing controllers from model, we learn desirable controllers directly from data, a new direction in control theory that arises from emerging applications in artificial intelligence and autonomous systems. Learning-based control is a direct control method aimed at developing computationally simple, analytically tractable (reinforcement) learning algorithms with guaranteed stability, robustness and optimality for the closed-loop system. In this talk, I will first review early developments in learning-based control for continuous-time linear and nonlinear systems with unknown dynamics. Then, I will present recent results in robustness of learning-based controllers. Finally, we illustrate the effectiveness of learning-based control via its applications to autonomous vehicles and biological motor control.

BRIEF 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*, France, in 1993, under the direction of Prof. Laurent Praly. Currently, he is an Institute Professor in the Department of Electrical and Computer Engineering and an affiliate professor in the Department of Civil and Urban 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 about 600 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, and is among the Clarivate Analytics Highly Cited Researchers and Stanford's Top 2% Most Highly Cited Scientists. In 2022, he received the Excellence in Research Award from the NYU Tandon School of Engineering. Prof. Jiang is a foreign member of the Academia Europaea (Academy of Europe) and an ordinary member of the European Academy of Sciences and Arts, and also is a Fellow of the IEEE, IFAC, CAA, AAIA and AAAS.

