

DEPARTMENT OF MECHANICAL ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“Intelligent Control for Robotics and Autonomous Systems”

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Abstract: Robotics and autonomous systems are making a profound impact on the humanity and are transforming our society. As one step towards full autonomy, intelligent control methods play a crucial role in the design and operation of robotics and autonomous systems. Such intelligent controllers should be capable of learning from the past operation experiences, and be able to adapt to the system and environmental uncertainties on real time. At the same time, these controllers should give performance guarantees of the systems, like to avoid collisions for autonomous cars, or to satisfy any other customer requirements and safety regulations. Potential system faults, or even malicious attacks by outside parties on the sensors and actuators of the system, should also be considered and mitigated during the operation. In this talk, iterative learning control and adaptive control methods will be investigated, for control problems of unicycle-type mobile robots, autonomous surface vessels, and vehicle platoons. The discussion will then be generalized to more generic nonlinear systems and multi-agent systems, with considerations on issues including prescribed system performance, finite/fixed-time tracking error convergence, nonlinear system uncertainties, stochastic disturbances, actuator faults, and sensor/actuator attacks. Future research directions in this domain are also discussed.

Bio: Xu Jin received his Bachelor of Engineering degree (equiv. B. S.)(First Hons.) in electrical and computer engineering from the National University of Singapore, Singapore, the Master of Applied Science (equiv. M. S.) degree in electrical and computer engineering from the University of Toronto, Toronto, ON, Canada, and the Master of Science degree in mathematics from the Georgia Institute of Technology, Atlanta, GA, USA. He is currently a Ph.D. candidate with the Daniel Guggenheim School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, USA.

Xu Jin’s current research interests include adaptive and iterative learning control, stochastic control, fault-tolerant control, nonlinear systems control, with applications to intelligent vehicles, mobile robots, robot manipulators, and multiagent systems, etc. He has 24 peer-reviewed journal papers that are already published or accepted, including 20 first-author journal papers published in the top-tier journals of the field like the IEEE Transactions on Cybernetics, the IEEE Transactions on Automatic Control, Automatica, the International Journal of Robust and Nonlinear Control, and Systems & Control Letters, etc., with over 530 citations. Xu JIN has been an active Reviewer for over 20 journals in the field of systems and controls, and dozens of international conferences.

Date: Monday, Feb. 11th

Place: CB 114

Time: 3PM

Contact: Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments

Attendance open to all interested persons