

Tokyo Institute of Technology



Analytic center selection of optimization-based controllers for robot ecology

13:40-14:20, May 16, 2024

Room: S5-207

Prof. Gennaro Notomista
University of Waterloo



Abstract: During their young life, robots, with the invaluable help of humans, have made the planet Earth arguably worse from an ecological perspective. Robot ecology, far from simply concerning itself with the employment of robotic systems in ecological studies, focuses on the development of robots and algorithms to optimize the relationships of autonomous machines with living organisms and their physical environment. To this end, constraint-driven control, owing to its opportunistic nature, demonstrated to be the right paradigm for decision making of robots deployed over long time horizons in unknown and evolving environments. Yet, the optimization-based nature of such controllers makes their analysis more difficult than their synthesis. In this talk, a novel approach for the analysis and synthesis of optimization-based controllers based on analytic center selection of differential inclusions is presented. Discussed applications will include long-term environmental monitoring and resilient control of multi-robot systems.



Robust Locomotion For Legged Robots

14:20-15:00, May 16, 2024

Room: S5-207

Prof. Lijun ZHU

**Huazhong University of Science
and Technology**



Abstract: This talk will present recent research work of the locomotion control and planning on legged robots at Control for Robotics and Autonomy Lab (Coralab) at Huazhong University of Science and Technology, China. We first consider the locomotion control in the presence of system uncertainties and address the problem using robust optimization-based control with a customized solver. Then, we discuss the robust and safe planning for robots under the perception uncertainties and propose a trajectory optimization method incorporating the distributionally robust optimization idea.

Short bio: Lijun Zhu received the Ph.D. degree in Electrical Engineering from University of Newcastle, Callaghan, Australia, in 2013. He is now a Professor in the School of Artificial Intelligence and Automation, Huazhong University of Science and Technology, Wuhan, China. Prior to this, he was a post-doctoral Fellow at the Department of Electrical and Electronic Engineering, The University of Hong Kong and a post-doctoral researcher at the University of Newcastle. His research interests include robotics, nonlinear systems analysis and control.
