COOL RESEARCH

系列报告第十四讲 （线上报告）

报告人：Yuanyuan Shi (UCSD助理教授)

报告题目：Performance-Guaranteed Learning and Control for Sustainable Energy Systems

Control, Optimization, Operations research, and Learning (COOL) Research Seminar是由北大工学院相关领域的几位老师发起，旨在为国内外青年学者提供一个交流平台，分享和探讨最新最有趣的研究成果，促进领域内和跨领域沟通学习，推动前沿理论的发展。

COOL RESEARCH 系列报告第十四讲 （线上报告）

Performance-Guaranteed Learning and Control for Sustainable Energy Systems

Abstract: The past decade has witnessed success of learning and control methods such as reinforcement learning (RL) in a broad spectrum of applications, such as game play, robotics, and autonomous driving. As a result, the application of RL in sustainability applications has attracted surging attention recently. Despite the promise, one of the biggest challenges for the deployment of RL in energy systems is the lack of stability and performance guarantees. Since energy systems are critical infrastructure, failure to maintain stability can lead to catastrophic consequences. In this talk, I will introduce our recent work on developing a stability constrained RL framework that combines policy learning in RL with Lyapunov stability in control to learn policy with formal stability guarantees. Using power system voltage control and frequency control as two illustrative examples, I will discuss how can we systematically construct the stability constraints and incorporate them into RL via neural network structure design.
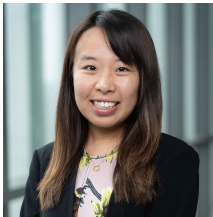
Speaker: Yuanyuan Shi (Assistant Professor at UCSD)

Biography: Yuanyuan Shi is an Assistant Professor at the Department of Electrical and Computer Engineering at the University of California San Diego. She received her Ph.D. in Electrical Engineering, masters in Electrical Engineering and Statistics, all from the University of Washington, in 2020. From 2020 to 2021, she was a Postdoctoral Scholar at the California Institute of Technology. Her research interests lie in the areas of machine learning, dynamical systems and control, with applications in sustainable energy systems. She is a recipient of multiple awards, including the Rising Star award in EECS by MIT in 2018, the Scientific Achievement Award from the University of Washington Clean Energy Institute in 2020, and the best paper finalist from ACM e-Energy 2022.

主持人：尤鹏程（北京大学工学院助理教授）