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THE CHINESE UNIVERSITY OF HONG KONG

Department of Information Engineering

Seminar

Control and Optimization for Reliable and Sustainable Networked Systems

By

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The Chinese University of Hong Kong

Date : 1 November 2024 (Friday)

Time : 12:30pm – 2:00pm

Venue : Rm 801, Ho Sin Hang Engineering Building, CUHK

Abstract

Networked systems, such as electric power, transportation, information, and communication systems, are providing critical commodities and services to our society. The control and optimization for their reliable and sustainable operations are becoming increasingly important yet more challenging today. The power systems, for example, are encountering the following difficult challenges. First, the growing solar and wind generations are introducing larger variations and uncertainties in system models and operating conditions. Second, there exist huge computational barriers in the control and optimization of power systems, due to the underlying mathematical models that are nonlinear, nonconvex, and sometimes combinatorial. Third, the power systems are managing more distributed resources that can compute, communicate, actuate, and strategically compete with each other, which would cause serious concerns on system scalability in terms of the speed of response, operational and computational efficiency, safety, user privacy, and other performance requirements.

I will introduce a few representative research outputs to overcome some of the challenges above, such as solving the hard nonconvex problems to optimize power flow and power network topology, neutralizing fast and large variations via scalable, distributed, cost-effective control, and learning from data for stabilizing, transient-safe, and dynamic-optimal control of power systems. Some of the theoretical findings and algorithmic designs from my research in power systems can potentially benefit wider applications in general networked systems. I will talk about my future research plans to develop practical solutions with theoretical performance guarantees for networked systems. I will also provide an overview of my teaching, research, and service activities in the past five years at CUHK.

Biography

Changhong Zhao received Bachelor of Engineering from Tsinghua University in 2010, and PhD in Electrical Engineering from Caltech in 2016. He worked at the US National Renewable Energy Laboratory in 2016 to 2019, after which he joined CUHK as an Assistant Professor. His research is in control and optimization for networked systems such as power systems. He received two PhD thesis prizes from Caltech, the RGC Early Career Award, and the IEEE Power and Energy Society Prize Paper Award.

**** ALL ARE WELCOME ****

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