

Model Predictive Control for Microgrids: From Power Electronic Converters to Energy Management

by

Prof. Jiefeng Hu

Professor, PhD, FIET, SMIEEE

Abstract

Microgrids provide an effective solution for integrating distributed energy resources (DERs) like wind and solar power. They can function independently or can be connected to the main grid. In the hierarchical control structure, power converters play a vital role in voltage stabilization and power conversion between the DERs and the grid. At the system level, energy management systems (EMS) optimize energy flow to maximize efficiency and economic benefits. This seminar will discuss the applications of model predictive control (MPC) in microgrids, highlighting its role in improving dynamic performance. The latest research advancements from the speaker's group in this area will also be presented, along with examples to illustrate how MPC is implemented.

Biography



Prof. Hu received a Ph.D. in electrical engineering from University of Technology Sydney, Australia. He participated in the research of minigrids at Commonwealth Scientific and Industrial Research Organization (CSIRO), Newcastle, Australia. He was an Assistant Professor at The Hong Kong Polytechnic University, Hong Kong. Subsequently, he joined Federation University Australia as an Associate Professor and the Discipline Lead of Electrical Engineering. He is currently a Full Professor and Stream Leader of the Centre for New Energy Transition Research, leading microgrids and renewable energy initiatives in close collaboration with industry. He is an awardee of the prestigious Australian Research Council (ARC) Future Fellowship. He served as General Co-Chair of IEEE PES 14th Asia-Pacific Power and Energy Engineering Conference (APPEEC 2022) at Melbourne and the 33rd Australasian Universities Power Engineering Conference (AUPEC 2023) at Ballarat. He is an Associate Editor for *IET Renewable Power Generation* and IEEE TRANSACTIONS ON ENERGY CONVERSION.

Date	: 21 March 2025 (Friday)
Time	: 2:30pm – 3:30pm
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**** ALL ARE WELCOME ****

Enquiry: Prof. Z Y Dong, Department of Electrical Engineering, City University of Hong Kong.
Tel.: 3442 7838, Fax.: 3442 0562, Email: eehead@cityu.edu.hk