October, 02, 2025
17:00 – 18:00
Amphi Mathilda – Colson 1, JUNIA Lille

Scientific Talk

"Data-Driven Approaches for Power System Stability: How Data Helps Predict and Prevent Instability"

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Abstract:

The rapid integration of renewable energy sources and the increasing complexity of modern power grids pose major challenges to maintaining power system stability. Traditional stability assessment methods, largely based on physics-driven models and offline simulations, often struggle to keep pace with highly dynamic operating conditions and the large amount of real-time data generated by today's networks.
This talk presents **data-driven approaches for power system stability**, with a particular focus on the application of **artificial intelligence (AI)** to rotor angle and frequency stability assessment, as well as islanding detection. Key aspects include data acquisition and preprocessing, feature extraction, model training, and validation, as well as the integration of AI-based algorithms into existing monitoring and control frameworks. Through representative case studies and recent research results, the presentation will demonstrate how **machine learning and deep learning techniques** can provide faster, more accurate, and adaptive stability assessments than conventional methods. Practical considerations—such as computational efficiency, cybersecurity, and the interpretability of AI models—will also be addressed. By highlighting both opportunities and challenges, this scientific talk aims to provide researchers, engineers, and system operators with valuable insights into how **AI-enabled, data-driven solutions** can enhance the resilience and reliability of future electric power systems

About the Speaker

Hêmin Golpîra was born on March 9, 1986, in Sanandaj, Kurdistan, Iran. He received his B.Sc., M.Sc., and Ph.D. degrees in electrical engineering in 2007, 2009, and 2015, respectively, all with honors. From 2015 to 2016, he was with the University of Wisconsin–Madison, USA, as an associate fellow. In late 2016, he joined the University of Kurdistan, Sanandaj, Iran, as an assistant professor, where he currently serves as an associate professor.
During the summers of 2019, 2021, 2023, and 2024, he was invited as a visiting professor at École Centrale de Lille and École Centrale de Nantes, France. He is currently serving as a visiting professor at L2EP, École Centrale de Lille. Hêmin serves as an associate editor of *IEEE Transactions on Power Systems* and *IET Generation, Transmission & Distribution*, and as an editor for *Electric Power Systems Research*. He has published 46 journal papers, including 8 papers in IEEE Transactions on Power Systems, and about 15 papers in international conferences. He is the recipient of the prestigious 2023 IEEE PES Best Paper Award and the author of a book published by Wiley-IEEE in 2021. Dr. Golpîra has participated in several internationally funded research projects,

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