TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

TRANSFORMING ENGINEERING EDUCATION

ENERGY & POWER GROUP SEMINAR

Automated Algorithm for Generator Dynamics in Large-scale Realistic Synthetic Grids: A Focus on Frequency Stability Perspectives

Abstract

The power systems' recent transformation has faced up to stability challenges, notably inertia reduction, decreased frequency nadir, and accelerated Rate of Change of Frequency (RoCoF). Addressing these issues, this seminar presents an automated algorithm for designing and validating generator dynamic models in large-scale realistic synthetic grids, with a focus on frequency stability perspectives. This enables researchers to conduct dynamic simulations and experiments that would otherwise be constrained due to limited access to actual power grid models. The methodology integrates a model-based approach for both conventional and renewable generators, with a time-domain approach to meet system requirements and frequency stability characteristics. The validation ensures compliance with system and frequency characteristic requirements, with the algorithm iterating this process until all criteria are met. Results and validation of dynamic models contain analyses about contingency scenarios and comparisons with actual grid scenarios. This seminar contributes a comprehensive approach to designing and validating generator dynamic models in large-scale realistic synthetic grids, showing its effectiveness in capturing system behaviors and frequency stability characteristics.

Jongoh Baek
Ph.D. Student
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Friday, March 8
11:30 am
241 ZACH

Biography

Jongoh Baek received his B.S and M.S. degree in electrical engineering from Kyungpook National University in Korea and is pursuing his Ph.D. degree in electrical engineering at Texas A&M University in United states. His current research interests include power system dynamics, impacts of integration of renewable generation on power system stabilities, and the development of synthetic power grid models, enriching our understanding of dynamic system behavior in this context.

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