



2024 PSERC Summer Tutorial

Representing distribution systems in transmission system-level studies

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Distribution systems are physically connected to and interact with transmission systems. Traditionally, due to grid operation practices, model complexity, and data availability issues, distribution and transmission systems are often simulated or analyzed separately or in a decoupled manner. As the primary components (i.e., demand and generation) of distribution systems, along with their dynamic and transient behaviors, evolve over time, their representations in transmission system-level studies must also adapt. This tutorial will first review typical representations and modeling of distribution systems in transmission system-level studies over time, focusing on dynamic transient stability, short-circuit, and electromagnetic transient (EMT) simulations. The parameterization of these models is an important topic for discussion. We will analyze gaps in some of these representations and explore recent efforts to improve them, as well as future directions for this field.

JULY 31, 2024

[REGISTRATION](#)

12:00 – 1:30 P.M. CT

(10:00 - 11:30 P.M. PDT)

Dr. Qihua Huang is an Associate Professor and leads the Power, Intelligence and Computing (PIC) Lab in the Electrical Engineering Department at Colorado School of Mines (Mines). Before joining Mines, he was a Principal Power System Engineer at Utilidata Inc and a Staff Power System Research Engineer at Pacific Northwest National Laboratory. He received his Ph.D. degree in electrical engineering from Arizona State University in 2016. He is the recipient of the 2019 IEEE Power and Energy Society (PES) Prize Paper Award, 2018 R&D 100 Award and a few best conference paper awards in IEEE PES General Meeting. His research interests include power system modeling, simulation and control, fusion and application of AI/machine learning and advanced computing technologies for digitizing and transforming power and energy systems.

