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MULTI-TIME-SCALE MODELING OF MULTI-TERMINAL HVDC GRIDS FOR INTERCONNECTION-LEVEL POWER SYSTEM ANALYSIS

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Wednesday, February 25 • 11 AM – 12 PM • EME 26 • Join Seminar (TEAMS)

ABSTRACT

Multi-terminal high-voltage direct current (MTdc) grids are increasingly deployed to support interconnections and renewable-energy integration. This presentation introduces scalable MTdc modeling approaches across multiple time scales, including production cost modeling, steady-state power flow, and phasor-domain transient stability simulation. The focus is on the relationships among MTdc models across these time scales and their respective fidelity characteristics. Representative case studies illustrate how model selection can be aligned with specific analytical objectives. Together, these cross-domain MTdc models provide a structured and scalable framework for incorporating MTdc grids into planning and operational studies of modern power systems.

BIO

Dr. Quan Nguyen received his B.E. degree in Electrical Engineering from Hanoi University of Science and Technology, Vietnam, in 2012 and his M.S. and Ph.D. degrees in Electrical Engineering from The University of Texas at Austin in 2016 and 2019, respectively. Since 2019, he has been a Power System Engineer at the Pacific Northwest National Laboratory. His research focuses on the modeling, control, optimization, and simulation of power systems with high penetrations of inverter-based resources, as well as flexible HVDC and low-frequency transmission systems.