



PSERC WEBINAR

Online Intrusion Tolerance and Response in Power Systems

Kate Davis

Texas A&M University

The power grid is a vast and interconnected cyber-physical system for delivering electricity. Treating the grid as a cyber-physical system requires new perspectives, including analysis techniques as well as operating procedures. Attacks on the grid could detrimentally affect public health and safety, yet its cyber infrastructure is not currently subjected to the intense analysis of its electrical counterparts. In this talk, we discuss challenges and opportunities for enabling online intrusion tolerance and response in power systems. The focus is on ensuring effective control under adversarial presence, for which we leverage the interdependencies of distributed controllers.

This talk formalizes the roles that distributed controllers play and quantifies how coordinated loss and compromise impacts the system. Based on this analysis, we present strategies for maintaining or regaining system control during such an attack. Analysis of physical interdependencies in formulating online response actions is heightened by considering cyber interdependencies as well. This talk will also present online control action selection in context of our cyber-physical security assessment (CyPSA) toolset. CyPSA is an online framework that analyzes and prioritizes operational reliability risks due to threats to the cyber infrastructure. In moving forward, the encompassed techniques are necessary in providing cyber-resilience to power grid and other cyber-physical critical infrastructures.

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Katherine Davis is an Assistant Professor in the Department of Electrical and Computer Engineering at Texas A&M University (TAMU). Previously, Dr. Davis was a Research Scientist with the Information Trust Institute and Adjunct Assistant Professor in the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. She founded kaedago, Inc. to provide cyber-physical situational awareness to utilities and worked as a Software Engineer and Senior Consultant for PowerWorld Corporation. She received her M.S. and Ph.D. degrees in Electrical and Computer Engineering from University of Illinois at Urbana-Champaign and B.S. degree from The University of Texas at Austin. Her interests include data-enhanced power system modeling and analysis, security-oriented cyber-physical techniques to defend electrical and cyber infrastructures, and making algorithms more robust with respect to untrustworthy inputs. Dr. Davis is a member of IEEE PES, IEEE COMSOC, ASEE, HKN, and Tau Beta Pi.

