Energy and Power Group

WEEKLY SEMINAR SERIES – FALL 2018

Monday, October 8th, 2018, 3:00 – 4:00 p.m., ETB 1003

Power System Equipment Cyber-Physical Risk Assessment Based on Architecture and Critical Clearing Time

Hao Huang
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Abstract

With the trend of constructing Internet protocol (IP)-based systems, modern power grids are involving into integrated networks made up of cyber and physical infrastructure with the goal of improving stability, reliability, and efficiency. Cyber technology is the backbone of modern power grid operation, yet vulnerabilities in the cyber network can introduce cyber-enabled disruption of physical components, which may lead catastrophic outcomes. Thus, cyber-physical risk assessment is needed for modern power grids to better prepare against unexpected contingencies. In this presentation, we are going to discuss the cyber-physical risk evaluation of digital relay based on power systems' cyber-physical architecture and each relay's critical clearing time respectively.

Biography

Hao Huang received his B.S. degree in Electrical Engineering in 2014 from Harbin Institute of Technology and an M.S degree in Electrical Engineering (Electric Power) in 2016 from the University of Southern California. He is a Ph.D. student in Electrical Engineering at Texas A&M University working on cyber-physical security analysis for power systems, power system restoration, power system network optimization, etc.

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Introduction to the Grid Project Impact Quantification Tool (GridPIQ)

Brandon Thayer
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Power Systems Engineer in the Electricity Infrastructure Group at PNNL

Abstract

A grid project, whether technology or policy added in one specific location, can have surprising and significant repercussions throughout the interconnected power system. Every project can impact the total energy consumption, voltage profiles in the distribution system, costs, mixture of fossil fuels, dispatch and so on. Benefits from these grid technologies can be significant, but unintended consequences can be surprising. Context matters — the same project can have wildly different impacts when rolled out in different places. The Grid Project Impacts Quantification (GridPIQ - https://gridpiq.pnnl.gov) web screening tool aims to incorporate enough detail about specific grid technology and objectives, coupled with enough detail about the power system to yield insight. The focus is on transparency, modularity, ease of use, and versatility rather than precision. The tool allows users to sift through the impacts of diverse ideas quickly and with confidence, importing specifics when known and drawing on clear, relevant suggestions when not. This talk will dive into how to use GridPIQ as well as the methodologies that drive the calculator engine by stepping through some examples.

Biography

Brandon Thayer is a Power Systems Engineer in the Electricity Infrastructure Group at Pacific Northwest National Laboratory (PNNL), and a current Master's student at Texas A&M University under Professor Overbye (graduating in 2020). His research interests include grid-based emissions quantification, volt/VAR optimization, distributed energy resource integration, modeling and simulation, and software development. Brandon graduated magna cum laude from the University of Washington with his B.S. in electrical engineering in 2016. Brandon completed three concentrations (sustainable electric energy, large scale power systems, and power electronics and electric drives) and a minor in mathematics.

Brandon joined PNNL in the summer of 2015 as an intern, and joined as a research engineer in 2016. Currently, Brandon leads development of GridPIQ and PNNL's GridAPPS-D™ volt/VAR application. Prior to joining PNNL, Brandon has worked for Alcoa performing arc flash hazard analysis and project management for plant infrastructure upgrades, and for Seattle City Light surveying distribution switchgear.

In his free time, Brandon enjoys hiking, backpacking, exercising, working on house projects, and spending time with friends and family.