Innovative Methods to Analyze and Visualize Protection System Performance in Transmission and Distribution Grids

~ by ~

Ashok Gopalakrishnan

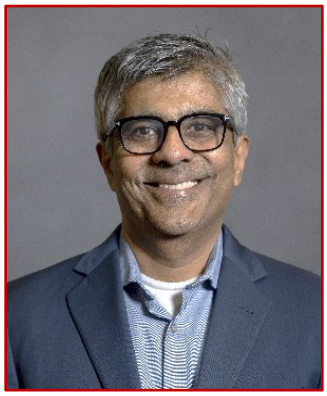
Siemens

Tuesday, October 31 • 11:00 AM – Noon (PT) • EME 26

OVERVIEW

The reliable operation of the electric power grid depends on the ability of protective relays to safeguard the electric system from abnormal operating conditions. Protective system operation must be capable of isolating the affected part of the grid as quickly as possible (sensitivity), and at the same time, ensuring that service disruption to customers is localized and contained to the smallest area possible (selectivity). These two requirements are conflicting in nature and force the protection engineer to strike a balance between them, taking into consideration, various factors. Complicating matters is the fact that the increasing penetration of inverter-based resources reduces the available dynamic stability margins of the power system, forcing protection to operate faster and faster. Additionally, the compliance and documentation requirements enforced by regulatory bodies such as NERC and regional reliability organizations, creates a challenging environment for the protection engineer whose main responsibility is to ensure that the protection system does it what it is supposed to do – protect the system from abnormal conditions.

In this presentation, we will discuss some innovative methods to analyze and visualize protection system behavior in this changing operational environment. A technique to include the behavior of the grid in standard protection studies will be presented. While geared towards interconnected transmission systems, these methods are applicable for distribution systems as well and the presentation will include some examples of such studies. Compliance with regulatory requirements and documentation are a natural byproduct of these analyses.



BIO

Dr. Ashok Gopalakrishnan has over 24 years of experience in power system analysis, with a focus on protection and control consulting services. He is currently the Head of Integration & Services for Grid Resilience products at Siemens, including PSS®CAPE. Prior to transitioning to this role, he was the director of the PSS®CAPE software product group for 3 years. Before that, at Siemens PTI and Quanta Technology, he was involved in protection and control consulting services including regulatory compliance, protection process automation and protection security assessments through software solutions. From 1999 to 2014, Ashok was with Electrocon International, Inc. (now part of Siemens) and was a key member of the PSS®CAPE engineering team.