PSERC Power Systems Engineering Research Center

2023 PSERC Summer Tutorial

Protection and Fault Response Analysis of Power Systems with High Share of Inverter Based Resources

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The integration of large amounts of inverter-based resources (IBRs), such as wind and solar energy, high voltage DC (HVDC) systems, and inverter-interfaced energy storages, into power grids affects power systems responses to large disturbances such as faults.

This tutorial will begin by discussing the fault response characteristics of IBRs and their controllers, and how these characteristics impact their responses to different types of faults. It will then explain how the distinct fault response characteristics of IBRs can affect protection systems. The tutorial will discuss real-world examples of protection systems mis-operations that have contributed to major outages in power grids with high shares of IBRs.

The vulnerabilities of protection systems in IBR-dominated power grids will be discussed from various perspectives such as the digital algorithms implemented inside protective relays, the working principles of protection systems, the coordination and settings of protective relays, and the architecture of protection schemes.

JULY 12, 2023 | **12:00 – 1:30 P.M. CT**

REGISTRATION

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

Saeed Lotfifard is an associate professor in the school of electrical engineering and computer science at Washington State University. He received his Ph.D. degree in electrical engineering from Texas A&M University in 2011. His research interests include protection, stability, and control of inverter-based power grids. He is a senior member of IEEE and serves as an associate editor for the IEEE Transactions on power delivery and IEEE Transactions on sustainable energy.