

Fall 2018 Seminar Series

Fault Location Identification for a Smart Distribution Network with Photovoltaics using Real-time Data

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Abstract: A fault location identification method for a smart distribution network is presented using a digital real-time simulator (DRTS). The method can accurately identify the fault location in a distribution network in the presence of DG. This method is based on state estimation algorithm which uses real-time data from simulated PMUs, placed in the distribution network. The method was validated using the IEEE 37 node test feeder with multi-source PV generation. PV model (transient model) along with its inverter and control are considered. Case studies are conducted for grid-connected and islanded mode to establish the effectiveness of the proposed method. The real-time model streams phasor data over the Internet using C37.118 protocol. A data concentrator is used to collect the real-time data coming from the DRTS, which is then stored in a database. In the last step of the FL process, stored data is fed into a FL identification algorithm to locate the fault. Both balanced and unbalanced fault types are applied to different nodes and an accurate estimation of the FL (over 90% of the cases) is achieved.

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Bio: Muhammad Usama Usman is a PhD candidate in Electrical Engineering at Florida State University, USA. He received the MSc degree in Electrical Engineering from Florida State University, USA in 2014. He served as a Lecturer with the Department of Electrical Engineering at UAJK, Pakistan from 2014 to 2015. He is presently working as a Research Assistant with Center for Advanced Power Systems, Florida State University. His current research interests include synchrophasor technologies and data analytics in power systems, outage management system and development of advanced metering infrastructure for smart grids. He is a student member of IEEE and PES.