ENHANCING POWER STATE ESTIMATION ACCURACY AND CYBER-SECURITY IN THE SMART GRID

by

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OVERVIEW

The talk addresses challenges related to the future state estimation of power systems. The state estimator provides situational awareness for operators at the control center and is exploited in many energy management system (EMS) operations. The presentation shows the challenges related to the integration of phasor measurement units (PMUs) in the static state estimator. The goal is to improve the accuracy of the estimation by exploiting PMU data. Cyber-security vulnerabilities that could be introduced in both the measurements and the topology of the grid are assessed on both the classical and the hybrid PMU-based SE. Power system model based solutions are proposed against cyber-attacks. The robustness is introduced by exploiting robust statistical signal processing and machine learning techniques. Finally, a robust dynamic state estimator that could ensure a high breakdown for large power systems is introduced.

BIO

Yacine Chakhchoukh (M’10) received his PhD in electrical engineering from Paris-Sud XI University, Paris, France, in 2010. He conducted research at Technical University Darmstadt, Darmstadt, Germany, Arizona State University, Tempe, AZ, USA, and the Tokyo Institute of Technology, Tokyo, Japan. His industrial experience was with the French Electrical Transmission System Operator (RTE-EDF, France). Currently, Dr. Chakhchoukh is an Assistant Professor at the University of Idaho, Moscow, ID. His research interests are cyber and physical security for the smart grid, power systems control and analysis. In 2017, he received the IEEE SPS Signal Processing Magazine best paper award.