Electrical & Computer Engineering

S E M I N A R

Louisiana State University

Harnessing the Potential of Synchronized Measurements for Enhancing Power Grid Visibility

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Abstract—The operation of modern electric power systems depends a great deal on the use of advanced sensing and measurement technologies that collect and collate synchronized data from multiple locations to monitor the health of network states for fast and accurate diagnosis of large system disruptions. Along with power grid's physical vulnerability to faults and disturbances, the inherent wide-area nature of the sensing, communication, and control systems in evolving smart grids presents several vulnerabilities in terms of possible cyberintrusions that may hinder or alter the normal operations of the entire cyber-physical grid infrastructure. For this reason, ensuring reliable event detection and maintaining system observability even under the threat of physical and cyberattacks remain a key challenge for developing a resilient power grid. Accordingly, this talk will provide distinctively new research efforts towards designing reliable and secure power grid infrastructure through versatile utilization of synchronized measurement systems. In particular, cost-effective deployment strategies for synchronized measurement devices, which allow for systemwide fault/attack localization and grid observability, will be presented with examples.

Bio—Dr. Mert Korkali received the B.S. degrees with a double major in electrical and electronics engineering and in industrial engineering from Bahcesehir University, Istanbul, Turkey, in 2008, and the M.S. and Ph.D. degrees in electrical engineering from Northeastern University, Boston, MA, in 2010 and 2013, respectively. From October 2013 to October 2014, he was a Postdoctoral Research Associate at the Complex Systems Center, The University of Vermont, Burlington, VT. Since November 2014, he has been a Postdoctoral Research Staff Member at the Computational Engineering Division, Lawrence Livermore National Laboratory, Livermore, CA. His research interests lie at the broad interface of power system state estimation, electromagnetic transient analysis, cyber-physical energy networks, cascading failures, and high-performance computing applications for large-scale power grids. He is a Member of the IEEE and SIAM, and regularly serves as a reviewer for several international journals.

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