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Center for Networked Computing
Computer and Information Sciences

Phasor State Estimation from PMU Measurements with Bad Data

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Abstract:
The phasor measurement units (PMU) are expected to enhance state estimation in the power grid by providing accurate and timely measurements. However, due to communication errors and equipment failures, some detrimental data can occur among the measurements. The largest residual removal (LRR) algorithm is commonly used for phasor state estimation with bad data. Here, we show that this method cannot guarantee correctness unless data redundancy is very abundant. We then establish the equivalence between the approaches of bad data removal and bad data estimation-and-subtraction. In addition, we propose two new algorithms by exploiting the sparsity of the bad data. All algorithms are tested by simulations and our projection and minimization (PM) algorithm provides the best performance.

Bio:
Dr. Liuqing Yang received her Ph.D. degree in Electrical and Computer Engineering from the University of Minnesota, Minneapolis, in 2004. Since August 2004, she has been with the Department of Electrical and Computer Engineering at the University of Florida, Gainesville, where she became an Associate Professor in 2009. Since 2010, she has been with Colorado State University as an Associate Professor. Her general interests are in areas signal processing with applications to communications, networking and power systems ï subjects on which she has published more than 150 journal and conference papers, 2 book chapters and 1 book. Dr. Yang was the recipient of the Best Dissertation Award in the Physical Sciences & Engineering from the University of Minnesota in 2004, the Best Paper Award at the IEEE International Conference on UWB in 2006, the AFOSR Summer Faculty Fellowship in 2007, the ONR Young Investigator Program (YIP) award in 2007, the NSF Faculty Early Career Development (CAREER) award in 2009, the IEEE GLOBECOM 2010 Outstanding Service Award, and the George T. Abell Outstanding Mid-Career Faculty Award in 2013. She has served as an active reviewer for more than 10 journals, as TPC chair/member for a number of conferences, and as an associate editor for IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Intelligent Transportation Systems, and PHYCOM: Physical Communication. Dr. Yang is a senior IEEE member, and has been the co-chair of the Mobile Communication Networks technical committee of the IEEE ITSS since 2006.