



Approximate Economic Dispatch Solutions of Power Networks with Wind and Distributed Storage

C. Lindsay Anderson

Department of Biological and Environmental Engineering
Cornell University
cla28@cornell.edu

PSERC Public Webinar

November 21, 2017

2:00-3:00 p.m. Eastern Time (11:00-12:00 p.m. Pacific)

Description: Modern tools are needed to cope with the uncertainty induced by the high penetration of renewable energy into power networks. Thus, energy storage has received increasing attention over the past decade. However, the optimal utilization of energy storage is a complex problem, due to its dynamic nature. This talk focuses on the economic dispatch problem for a power network coupled with wind farms and energy storage facilities, taking into account the intertemporal constraints of distributed storage. Exploiting the information-decision structure, the problem is formulated via stochastic dynamic programming (SDP). Typically limited to very small problems, the SDP approach cannot be applied to realistically sized problems. We deal with this inherent limitation via a combination of linear programming, cutting plane methods and stochastic dual dynamic programming, widely used to solve hydrothermal problems, but with very limited applications in stochastic economic dispatch problems. In this presentation, we will provide an overview of the approach and highlight its potential with an illustrative case-study on the IEEE 118-bus network.

Biography: C. Lindsay Anderson is the Norman R Scott Sesquicentennial Faculty Fellow and Associate Professor at Cornell University, participating in the graduate fields of Environmental Engineering, Electrical and Computer Engineering, and Systems Engineering. Her research interests focus on enabling a sustainable energy future with high penetration of renewable resources, consumer participation, and a reliable grid. To achieve this aim, the Anderson research group focuses on developing scalable methods to characterize and incorporate renewables, storage, and demand side resources in unit commitment and economic dispatch algorithms for the electric grid. Lindsay holds a B.Sc.(Eng) in Environmental Engineering from the University of Guelph, and a Ph.D. in Applied Mathematics from Western University (Canada), and is a Faculty Fellow with the Atkinson Center for a Sustainable Future.