



BIG energy seminar series

Addressing global energy challenges in scale and complexity.



Distributed Control Design for Balancing the Grid Using Flexible Loads

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Date: Tuesday, May 22 at 2pm

Location: [Onizuka Conference Room \(ECAE 199\)](#)

Abstract:

Inexpensive energy from the wind and the sun comes with unwanted volatility, such as ramps with the setting sun or a gust of wind. Controllable generators manage supply-demand balance of power today, but this is becoming increasingly costly with increasing penetration of renewable energy. It has been argued since the 1980s that consumers should be put in the loop: "demand response" will help to create needed supply-demand balance. However, consumers use energy for a reason, and expect that the quality of service (QoS) they receive will lie within reasonable bounds. Moreover, the behavior of some consumers is unpredictable, while the grid operator requires predictable controllable resources to maintain reliability. The goal of this lecture is to describe an emerging science for "demand dispatch" that will create virtual energy storage from flexible loads. By design, the grid-level services from flexible loads will be as controllable and predictable as a generator or fleet of batteries. Strict bounds on QoS will be maintained in all cases. The technical foundation is primarily a new approach to distributed control.

Bio:

Sean Meyn is now Professor and Robert C. Pittman Eminent Scholar Chair in the Department of Electrical and Computer Engineering at the University of Florida, the director of the Laboratory for Cognition & Control, and director of the Florida Institute for Sustainable Energy. His academic research interests include theory and applications of decision and control, stochastic processes, and optimization. He has received many awards for his research on these topics, and is a fellow of the IEEE. His award-winning 1993 monograph with Richard Tweedie, *Markov Chains and Stochastic Stability*, has been cited thousands of times in journals from a range of fields. For the past ten years, his applied research has focused on engineering, markets, and policy in energy systems.

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