

A School of Engineering Seminar San Francisco State University

Distributed Decision- making and Control in Smart Grid



SF STATE

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**School of ECE
Georgia Tech**

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Synopsis:

Today's power systems are operated and controlled in a hierarchical way under which monitoring and control tasks are handled at different hierarchical levels. However, emerging technologies, such as renewable energy sources, distributed generators, and electric vehicles, pose new challenges to the operation and control of legacy power systems due to the increased scale and complexity. To overcome these challenges, it is envisioned that future, smart grids will be populated with multiple decision makers, which are able to produce, consume, and/or store electricity. These economically motivated agents are known as prosumers (producer-consumers). Under the prosumer-based framework, smart grids will be operated and controlled in a distributed architecture. The challenges are thus how to gracefully extend the current control and management paradigm to smart grids comprised of prosumers.

In this seminar, I will discuss my recent efforts to address one particular, technical aspect of the prosumer-based smart grids, namely the frequency regulation problem. I present a general framework for distributed frequency regulation in smart grids and address the problem of how thousands of spatially distributed and heterogeneous prosumers can regulate frequency in a distributed and robust manner.

Speaker Bio:

Masoud Nazari is a Post-Doctoral Fellow in the School of Electrical and Computer Engineering at Georgia Tech. He is also a Research Associate Consultant at Gridquant Technologies. He obtained his dual PhD in Electrical and Computer Engineering (Power Systems) and Engineering and Public Policy (Energy Policy) from Carnegie Mellon University through CMUPortugal program in 2012. He was awarded the five-year international FCT fellowship in 2007 and was a visiting PhD student at MIT Energy Initiative in 2010. His research interests include: smart grid, distributed operation and control of electric energy systems, renewable integration, and regulation design for modernizing legacy power systems.