



# **Variational Optimal Power Flow and Dispatch Problems and their Approximations**

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PSERC Public Webinar

April 18, 2017

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

**Description:** In this presentation we will discuss the formulation of classic optimization problems in power systems in continuous time, considering the optimal power flow and the unit commitment problem in particular. The motivation for looking at this problem is the scarcity of ramping resources and their increasing importance motivated by the variability of power resources, particularly due to the addition of solar power, which exacerbates the need of fast ramping units in the early morning and early evening hours. We show that the solution for the marginal price can be found through Euler-Lagrange equations and we argue that this price signal better reflects the market value of power in the presence of significant ramps in net-load. We look at the stochastic counterpart and discuss how one can use spline representations to numerically compute approximate solutions that asymptotically converge to the optimum ones.

**Biography:** Anna Scaglione (M.Sc.'95, Ph.D. '99) is a professor in the electrical, computer and energy engineering department at ASU since 2015. Prior to that, she was a professor at the University of California at Davis (from '08), she became an Associate professor at Cornell University in 2006 and before joining Cornell, she was Assistant Professor at the University of New Mexico (from 2000-2001). She is IEEE fellow since 2011 and received the 2013 IEEE Donald G. Fink Prize Paper Award, and the 2000 IEEE Signal Processing Transactions Best Paper Award the NSF CAREER grant (2002). She coauthored with her student the papers that received the 2013 IEEE Signal Processing Society Young Author Best Paper Award and the Ellersick Best Paper Award (MILCOM 2005). Dr. Scaglione's research is in statistical signal and array processing and focuses on applications to network science, distributed learning, information systems and networked infrastructures for energy delivery.