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**Talk Title:** Approximations of Variational Problems in Power Systems Operations

**Abstract:** Scheduling and optimization problems in power systems, such as the optimal power flow and the unit commitment problem, are aimed at balancing demand and supply of electricity in continuous time. The variability and stochastic nature of renewable resources, particularly solar power, exacerbate sharp inter-hourly variations in the net load, particularly in the early morning and early evening hours. In this presentation, we look more thoroughly at the problem of approximating the variational solution and show that, rather than finding implicit solutions through Euler-Lagrange equations, one can use spline representations to numerically compute approximate solutions that asymptotically converge to the optimum ones. We specifically discuss the so-called Unit Commitment problem, that is concerned with finding the optimum set of generating units over a future horizon, and show how one can find schedules that place online the right portfolio of resources leading to savings in the real-time energy market.