Electric Vehicles in the Smart Grid: Optimization & Control

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Abstract

The rapid electrification of the transportation fleet imposes unprecedented demands on the electric grid. If controlled, however, these electric vehicles (EVs) provide an immense opportunity for smart grid services that enable decarbonization and increased reliability. In this talk we discuss paradigms for aggregating and optimally controlling EV charging. Specifically, we discuss (i) aggregate modeling via partial differential equations, (ii) distributed robust optimization of large-scale EV fleets, and (iii) a remarkably effective heuristic for solving large-scale mixed integer programs based on "Dual Hopfield Methods", with application to EVs. The talk closes with future perspectives for EVs in the Smart Grid.

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