

Seminar
Optimization and Equilibrium

Expositor

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Title:

A Game Theoretic Model for Optimizing Electricity Consumers Flexibilities in the Smart Grid.

Abstract:

With the evolution of electricity usages (electric vehicles, smart appliances) and the development of communication structures (smart grid), new opportunities of optimization have emerged for the actors of the electrical network. Aggregators can send signals to enrolled consumers to play on their demand flexibilities, and to optimize the providing costs and the social welfare.

Game theory has been shown to be a valuable tool to study strategic electricity consumers participating in such a demand side management program. We propose a simple billing mechanism where the aggregator sends his price functions, depending on the aggregated demand, to the consumers, which confers a structure of a routing congestion game.

After giving results on the existence and uniqueness of the Nash equilibrium in this game, we provide a bound on the Price of Anarchy in a particular case. Next, we address the computational issue of this equilibrium profile by providing results on the convergence rates of two decentralized algorithms to compute the equilibrium: the cycling best response dynamics and a projected gradient descent method.

Last, we present some extensions of this model and the theoretical questions that are associated.

Miércoles 16 de mayo a las 16:30 hrs, Sala de Seminarios John Von Neumann CMM, Beauchef 851, Torre Norte, Piso 7.



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