

Alejandro Jofre

(joint work with Juan F. Escobar, U. Chile)

Equilibrium Analysis of Electricity Auctions

« This paper considers an electricity spot market consisting of a network, a set of producers located in nodes of the network, and a central agent. Production is organized by means of an auction. Once firms simultaneously bid cost functions, the central agent decides the quantity each firm produces and the flows through the network lines. The purpose of the central agent is to minimize the overall network cost while respecting network constraints. On the other hand, firms are aware of their ability to manipulate the central agent dispatch procedure and, when bidding, each firm's goal is to obtain revenues as high as possible. In this paper, the described setting is modeled as a noncooperative game. By using epiconvergence, the existence of noncooperative equilibrium is guaranteed for a wide class of electricity auctions. Our results apply to models in which firms supply either piecewise constant, parameterized, or arbitrary increasing supply functions. A notion of Walrasian equilibrium is advanced and efficiency properties are explored. Examples are provided. We also discuss how important and natural are mixed strategies in this setting ».