

Application of possibility theory to robust Cournot equilibriums in electricity market

F.A. Campos, J. Villar, J. Barquín

Abstract— It is known that Cournot game theory has been one of the theoretical approaches used more often to model electricity market behavior. Nevertheless, this approach is highly influenced by the residual demand curves of the market agents, which are usually not precisely known. This imperfect information has normally been studied with probability theory, but possibility theory might sometimes be more helpful in modeling not only uncertainty but also imprecision and vagueness. In this paper, two dual approaches are proposed to compute a robust Cournot equilibrium, when the residual demand uncertainty is modeled with possibility distributions. Additionally, it is shown that these two approaches can be combined into a bicriteria programming model, which can be solved with an iterative algorithm. Some interesting results for a real-size electricity system show the robustness of the proposed methodology.

Index Terms— Electricity market, Cournot game theory, Possibility Theory, Fuzzy programming, Chance constraints

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Probability in the Engineering and Informational Sciences, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Campos, F.A.; Villar, J.; Barquín, J.; "Application of possibility theory to robust Cournot equilibriums in electricity market", Probability in the Engineering and Informational Sciences, vol.19, no.4, pp.519-531. October, 2005.