Market power issues in bid-based hydrothermal dispatch

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Abstract-

The objective of this work is to investigate market power issues in bid-based hydrothermal scheduling. Initially, market power was simulated with a single stage Cournot-Nash equilibrium model. In this static model the equilibrium was calculated analytically. It was shown that the total production of N strategic agents is smaller than the least-cost solution by a factor of (N/(N+1)). Market power analysis for multiple stages was then carried through a stochastic dynamic programming scheme, where the decision in each stage and state is the Cournot-Nash equilibrium of a multi-agent game. Case studies with data taken from the Brazilian system are presented.

Index Terms- hydrothermal scheduling, stochastic optimization, market power, game theory, Cournot-Nash equilibrium

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