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Strategic bidding under uncertainty: a binary expansion approach

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Abstract-

This work presents a binary expansion (BE) solution approach to the problem of strategic bidding under uncertainty in short-term electricity markets. The BE scheme is used to transform the products of variables in the nonlinear bidding problem into a mixed integer linear programming formulation, which can be solved by commercially available computational systems. The BE scheme is applicable to pure price, pure quantity, or joint price/quantity bidding models. It is also possible to represent transmission networks, uncertainties (scenarios for price, quantity, plant availability, and load), financial instruments, capacity reinforcement decisions, and unit commitment. The application of the methodology is illustrated in case studies, with configurations derived from the 80-GW Brazilian system.

Index Terms- Electricity pool market, market models, mixedinteger linear programming, optimization methods.

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