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Conjectural-variation-based equilibrium model of a single-price electricity market with a counter-trading mechanism

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Abstract-

This paper presents a new conjectural-variation- based equilibrium model of a single-price electricity market. In the electricitymarket, firstly, themarket clearing process is performed in the day-ahead market and after that, a counter-trading mechanism is used to clear the network congestion. The system may have any configuration, either radial or meshed, and there is not restriction on the size of the system. The main contribution of the model is that the market equilibrium equations incorporates the effect of congestion between multiple areas in the agents’ strategic behavior. Furthermore, the market equilibrium equations are solved using an equivalent optimization problem. The optimization problem has two levels. The first level corresponds to the day-ahead market and the second level is a DC optimal power flow that solves the network congestion. Numerical results are provided to illustrate the performance of the proposed approach.

Index Terms- Conjectured-price response, counter-trading, electricity market, market equilibrium, network congestion.

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