Morteza Vahid-Ghavidel, Nadali Mahmoudi, and Behnam Mohammadi-ivatloo, 2018, Self-Scheduling of Demand Response Aggregators in Short-Term Markets Based on Information Gap Decision Theory, *IEEE Transactions on Smart Grid,* early access: http://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=5446437.

Abstract This paper proposes a new self-scheduling framework for demand response aggregators, which contributes over the existing models in following aspects. The proposed model considers the uncertainties posed from consumers and electricity market prices. Further, the given model applies the information-gap decision theory (IGDT) in the self-scheduling problem, which guarantees the predefined profit by the aggregator and avoids computational burdens caused by scenario-based methods such as stochastic programming approaches. The DR aggregator procures DR from two proposed programs, i.e. reward-based DR and time-of-use (TOU). Then, the obtained DR is offered into day-ahead and balancing markets. An IGDT-based profit function is proposed, which leads to a bilevel program. The given bilevel model is then transformed into an equivalent single-level model by developing a non-KKT method, which is solved through commercial solvers available in General Algebraic Modeling System (GAMS). The feasibility of the problem is studied using a case study with realistic data of electricity markets.

Keywords Demand response aggregator, information-gap decision theory, electricity markets, time-of-use, reward-based DR, uncertainty.

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