Ramin Nourollahi, Sayyad Nojavan and Kazem Zare, 2020, Risk-based purchasing energy for electricity consumers by retailer using information gap decision theory considering demand response exchange, in Sayyad Nojavan and Kazem Zare, eds., *Electricity Markets: New Players and Pricing Uncertainties,* Springer, pp.135–168.

Abstract of the chapter Electricity retailer using demand response (DR) programs can reduce their cost in procuring consumers energy. In this chapter, several new demand response schemes are proposed to reduce retailer cost. These new schemes include pool-order DR, forward DR, and reward-base DR. Information gap decision theory (IGDT) technique is proposed to handle the pool market price uncertainty. Furthermore, optimal bidding strategy of electricity retailer is obtained using IGDT technique based on opportunity and robustness functions. Optimal bidding strategy provides stepwise power price in the power price uncertainty condition for submiting to day-ahead market in order to purchase power from pool market. The proposed model based on IGDT technique can be solved using standard Branch and Bound (SBB) solver under GAMS software.

Keywords Forward, pool-order, and reward-base DR programs; Information gap decision theory (IGDT); Optimal bidding strategy of electricity retailer.

Abstract of the book This book analyzes new electricity pricing models that consider uncertainties in the power market due to the changing behavior of market players and the implementation of renewable distributed generation and responsive loads. In-depth chapters examine the different types of market players including the generation, transmission, and distribution companies, virtual power plants, demand response aggregators, and energy hubs and microgrids. Expert authors propose optimal operational models for short-term performance and scheduling and present readers with solutions for pricing challenges in uncertain environments. This book is useful for engineers, researchers and students involved in integrating demand response programs into smart grids and for electricity market operation and planning.

- Proposes optimal operation models.
- Discusses the various players in today's electricity markets.
- Describes the effects of demand response programs in smart grids.