Hamed Pashaei-Didani, Arash Mohammadi, Hamed Ahmadi-Nezamabad and Sayyad Nojavan, 2020, Information gap decision theory — based risk-constrained energy management of DC microgrids, chapter 5 in *Risk-Based Energy Management: DC, AC and Hybrid AC-DC Microgrids,* Sayyad Nojavan, Mahdi Shafieezadeh and Noradin Ghadimi, eds., Academic Press.

Abstract It is obvious that each uncertain parameter may have pernicious or beneficial effects on the system under study. Among different developed uncertainty modeling methodologies, just a few of them can model both negative and positive effects. Information gap decision theory (IGDT) can be considered the most important one. The IGDT develops robustness and opportunity functions, in which the former models the negative side while the latter models the positive aspect of the uncertainty in any desired system. In this chapter the optimal energy management of DC microgrid (MG) is carried out under power price uncertainty utilizing the IGDT method. Considering robustness, deterministic, and opportunity functions, three strategies — risk-averse, risk-neutral, and risk-taker — are derived to provide a quantitative result for the decision-maker. Each of the strategies is solved in two cases, with and without implementing the demand response program to reduce the total operating cost of the DC MG.

Keywords DC microgrid, uncertainty modeling, demand response program, information gap decision theory, risk-taker, risk-neutral, risk-averse.

\website\IGT\pashaei-didani-etal2020abs.tex 4.8.2019