Navid Rezaei, Abdollah Ahmadi, Ali Esmaeel Nezhad and Amirhossein Khazali, 2019, Information-gap decision theory: Principles and fundamentals, chapter 2 in Behnam Mohammadi-ivatloo and Morteza Nazari-Heris, eds., 2019, *Robust Optimal Planning and Operation of Electrical Energy Systems,* Springer. DOI: 10.1007/978-3-030-04296-7_2

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Abstract Solving optimization problems with multiple uncertainties has always been a challenging task in different scopes of science. While different approaches have been developed to take advantage of the stochastic space of the problem, these methods are intensively dependent of the probabilistic information of various variables which are not always available. Relying on the severity of the failure, information-gap decision theory (IGDT) is a robust optimization approach which is entirely autonomous from probabilistic information. In this model, a forecasted amount is presumed for each uncertain variable, and the sensitivity of objective functions is analyzed according to the deviation of each of these uncertain parameters from their forecasted value. In this method, two main types of uncertainty set models including energy-bound model and envelope-bound model are handled. In this chapter, these principles and fundamentals of IGDT are described.

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