Ahmad Nikoobakht, Jamshid Aghaei, Miadreza Shafie-khah, João P.S.Catalão, 2022, Risk-averse decision under worst-case continuous and discrete uncertainties in transmission system with the support of active distribution systems, *Intl J. of Electrical Power & Energy Systems*, vol.138, June 2022. https://doi.org/10.1016/j.ijepes.2021.107913

Highlights

- Developing a new uncertainty approach to handle worse-case continuous and discrete uncertainties.
- Proposed a new risk-averse energy management.
- Co-operation of transmission system and active distribution systems.

Abstract Nowadays, risk-averse management is a principal concern for transmission system (TS) operator that involve different types of uncertainty including continuous uncertainties (e.g., wind energy uncertainty) and discrete uncertainties (e.g., generator/line outages). In this condition, risk-averse decision making for managing these uncertainties are extremely complex, and the complexity is more amplified by the worst-case uncertainties. Accordingly, in this study a novel contingency-constrained information gap decision theory (CC-IGDT) approach has been proposed to cope with worst-case continuous and discrete uncertainties. Also, active distribution systems (ADSs) with distributed energy resources are important components in a TS, and can play an important role in addressing the issue of risk-averse management for TS operator. Therefore, in this study a coupled operation model for the TS & ADSs with the CC-IGDT approach has been proposed. But, solve proposed coupled operation model is problematic, thus, to solve this problem a new four-level hierarchical optimization technique has been proposed. Finally, the IEEE 30-bus transmission and IEEE 33-bus distribution systems have been analyzed to show the effectiveness of the proposed CC-IGDT approach and the co-operation of TS & ADSs.

Keywords Risk-averse management, Active distribution systems, Worst-case continuous and discrete uncertainties, Information gap decision theory.