Abdollah Ahmadi, Ali Esmaeel Nezhad and Branislav Hredzak, 2019, Security-constrained unit commitment in presence of lithium-ion battery storage units using information-gap decision theory, *IEEE Transactions on Industrial Informatics,* vol. 15 , Issue: 1 , Jan. 2019, pp.148–157.

Abstract This paper proposes a robust framework for the security-constrained unit commitment (SCUC) of generating units, in the presence of lithium-ion battery energy storage units, using the information-gap decision theory (IGDT) technique. In the suggested model, the degradation cost of the battery storage units has been considered in the objective function as a highly influencing factor in the operation of such storage units. The framework is independent of probability density functions or membership of sets and enables the system operator to adjust the conservatism of the operating strategy (between overconservative and reckless) against the load demand uncertainty. In this respect, the SCUC model has been presented within a day-ahead scheduling problem on the hourly basis using mixed-integer linear programming. Finally, the proposed framework has been simulated on a typical 6-bus test system as well as IEEE 24-bus and IEEE 118-bus systems to verify the efficiency and the effectiveness of the model using the IGDT technique.

Keywords Energy storage systems (ESSs), information-gap decision theory (IGDT), load uncertainty, security-constrained unit commitment (SCUC)