

Two-Stage Linearization of Frequency Nadir Constraint for Unit Commitment

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Post-disturbance frequency nadir (FN) is an important index of system frequency security. The FN constraint should be integrated to the security-constrained unit commitment (SCUC) to avoid under-frequency load shedding. Due to its nonlinear and nonconvex feature, the SCUC problem with original FN constraint cannot be directly solved. This letter proposes a two-stage linearization method to transform the FN into a linear function of generator status variables, enabling good interpretability of FN. Case studies of large-scale systems indicate that this method exhibits high accuracy and low computation workload. Thus, it provides the SCUC with a fast tool.