

عنوان مقاله:

Fuzzy Risk-Based Optimal Reactive Power Dispatch in a Wind-Integrated Power System

محل انتشار:

فصلنامه مهندسی برق دانشگاه تبریز، دوره 53، شماره 1 (سال: 1402)

تعداد صفحات اصل مقاله: 11

نویسندگان:

میثم مکاری - *Department of Electrical & Computer Engineering / Bu-Ali Sina University, Hamedan, Iran*

محمدحسن مرادی - *Department of Electrical & Computer Engineering / Bu-Ali Sina University, Hamedan, Iran*

محمد عابدینی - *Department of Electrical Engineering/ University of Ayatollah Boroujerdi, Boroujerd, Iran*

خلاصه مقاله:

In this paper, a novel risk-based, two-objective (technical and economical) optimal reactive power dispatch method in a wind-integrated power system is proposed which is more consistent with operational criteria. The technical objective includes the minimization of the new voltage instability risk index. The economical objective includes cost minimization of reactive power generation and active power loss. The proposed voltage instability risk employs a hybrid possibilistic (Delphi-Fuzzy)-probabilistic approach that takes into consideration the operator's experience, the wind speed and demand forecast uncertainties when quantifying the risk index. The decision variables are the reactive power resources of the system. To solve the problem, the modified multi-objective particle swarm optimization algorithm with sine and cosine acceleration coefficients is utilized. The method is implemented on the modified IEEE ۳۰-bus system. The proposed method is compared with those in the previously published literature, and the results confirm that the proposed risk index is better at estimating the voltage instability risk of the system, especially in cases with severe impact and low probability. In addition, according to the simulation results compared to typical security-based planning, the proposed risk-based planning may increase the security and economy of the system due to better utilization of system resources.

کلمات کلیدی:

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1643718>

