

عنوان مقاله:

Probabilistic Optimal Power Flow considering wind and load uncertainties using $2m+1$ point estimation method

محل انتشار:

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نویسندگان:

Salar Balaei-sani - Faculty of Electrical and Computer Engineering, University of Tabriz, Tabriz, Iran

Farkhondeh Jabari - Faculty of Chemical and Petroleum Engineering, University of Tabriz, Tabriz, Iran

Behnam Mohammadi-ivatloo - Faculty of Electrical and Computer Engineering, University of Tabriz, Tabriz, Iran

خلاصه مقاله:

Due to electrical demand variations and wind speed uncertainties, many scholars have focused on probabilistic optimal power flow (POPF) analysis of large-scale power systems. Hence, this paper aims to implement $2m+1$ point estimation method on POPF problem for modeling the uncertainties associated with electrical demand and wind product. Meanwhile, the wind speeds are not independent in adjacent areas. This affects the optimum operating point of the interconnected energy networks. This problem also exists between the neighbor loads. Hence, it is important to consider these correlations in POPF. Therefore, Nataf transformation is utilized for making these uncertain variables independent and using uncorrelated input random variables in PEM algorithm. Simulations are conducted on 24-bus IEEE standard power system and solved under generalized algebraic mathematical modeling system (GAMS) optimization package using COUENNE tool. Total fuel cost of conventional thermal power plants is minimized as objective function in stochastic power flow analysis. The optimum generation schedules of thermal units, bus voltage angle, transmission active power, electrical demand of each load bus, and the wind generation of each wind farm are selected as decision variables.

کلمات کلیدی:

Probabilistic Optimal power flow (POPF), wind speed uncertainty, point estimation method (PEM), Nataf transformation, generalized algebraic mathematical modeling system (GAMS)

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