عنوان مقاله:

A Neural Network-Based Model for Wind Farm Output in Probabilistic Studies of Power Systems

محل انتشار:

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خلاصه مقاله:

The penetration of wind energy in power systems has been growing due to its interminable and mild environmental effects. The intrinsic attributes of this environmentally-friendly energy, i.e., the stochastic nature of wind farms generation, however, imposes various technical and financial challenges into power systems. So, developing an accurate wind farm modeling approach aimed at taking into account the wind generation intermittency can relieve many of these challenges. Therefore, this paper takes a step to an efficient wind farm modeling procedure employing an accurate as well as well-known Neural Network (NN)-based tool. The proposed approach is comprised of two main steps. The wind speed is predicted in the first step by the time-series NN method. It then continues in the second step with extracting the predicted wind farm outputs and representing the wind farms generation via a multistate model. To this end, an efficient clustering method, i.e., the Fuzzy c-means Clustering Method (FCM) is employed to find the optimal states. Having applied the proposed approach on the case studies, it will confirm that the proposed analytical multistate model can efficiently consider the wind farms output uncertainties in various studies like the conventional units with less computational burden

کلمات کلیدی:

Fuzzy c-means Clustering Method (FCM), multistate model, time-series Neural Network (NN), wind farm output modelling, wind speed forecasting