عنوان مقاله:

Combined Use of Sensitivity Analysis and Hybrid Wavelet-PSO- ANFIS to Improve Dynamic Performance of DFIG-Based Wind Generation

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خلاصه مقاله:

In the past few decades, increasing growth of wind power plants causes different problems for the power quality in the grid. Normal and transient impacts of these units on the power grid clearly indicate the need to improve the quality of the electricity generated by them in the design of such systems. Improving the efficiency of the large-scale wind system is dependent on the control parameters. The main contribution of this study is to propose a sensitivity analysis approach integrated with a novel hybrid approach combining wavelet transform, particle swarm optimization and an Adaptive-Network-based Fuzzy Inference System (ANFIS) known as Wavelet-ANFIS-PSO to acquire the optimal control of Doubly-Fed Induction Generators (DFIG) based wind generation. In order to mitigate the optimization complexity, sensitivity analysis is offered to identify the Unified Dominate Control Parameters (UDCP) rather than optimization of all parameters. The robustness of the proposed approach in finding optimal parameters, and consequently achieve a high dynamic performance is confirmed on two area power system under different operating conditions.

کلمات کلیدی:

Doubly fed induction generator, fuzzy logic, Particle Swarm Optimization, Wavelet transform, Sensitivity analysis