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Wei Qiao

University of Nebraska–Lincoln, wqiao@engr.unl.edu

Ronald G. Harley

Georgia Institute of Technology

Ganesh Venayagamoorthy

Missouri University of Science and Technology

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Coordinated Reactive Power Control of a Large Wind Farm and a STATCOM Using Heuristic Dynamic Programming

Wei Qiao¹, Ronald Harley², Ganesh Venayagamoorthy³

¹University of Nebraska-Lincoln, ²Georgia Institute of Technology, ³Missouri University of Science and Technology

A novel interface neurocontroller (INC) is proposed for the coordinated reactive power control between a large wind farm equipped with doubly fed induction generators (DFIGs) and a static synchronous compensator (STATCOM). The heuristic dynamic programming (HDP) technique and radial basis function neural networks (RBFNNs) are used to design this INC. It effectively reduces the level of voltage sags as well as the over-currents in the DFIG rotor circuit during grid faults, and therefore, significantly enhances the fault ride-through capability of the wind farm. The INC also acts as a coordinated external damping controller for the wind farm and the STATCOM, and therefore, improves power oscillation damping of the system after grid faults. Simulation studies are carried out in PSCAD/EMTDC and the results are presented to verify the proposed INC.