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

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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.