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Development and performance analysis of intelligent fault ride through control scheme in the dynamic behaviour of grid-connected DFIG based wind systems

intelligent fault ride through strategy for Doubly Fed Induction Generators (DFIG) based Wind Energy Conversion Systems (WECS) are proposed to achieve real and reactive power control during grid faults. The transient behaviour of the system is investigated under normal conditions and during grid faults. A fuzzy based wind speed estimation method in Maximum Power Point Tracking (MPPT) mode under normal conditions and coordinated Genetic Algorithm based Real Reactive (GA-PQ) controller with DC chopper in Fault Ride Through (FRT) mode during grid faults is developed in this work. The proposed control scheme provides smooth operation of DFIG during grid faults by controlling the rotor and grid side converters, providing reactive power support to the grid and relieving stress on power converters thereby achieving system stability. The proposed strategy maintains the system parameters during the grid faults by suppressing the rotor and stator over current, dc link voltage overshoot, power oscillations and support the grid voltage under both balanced and unbalanced grid fault conditions with different voltage dips at PCC.

Domain: Power Systems _ Wind Power Generation
Technology: Electrical