

Real Time Implementation of Grid-connection controlling Robust PLL for WECS in Variable Speed DFIG-based on HCC

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Abstract : This paper presents the experimental real time implementation of a grid-connection field-oriented control (FOC) for wind turbine based on a doubly fed induction generator (DFIG). A control law is synthesized using a hybrid FOC Hysteresis Current Controller (HCC) in Rotor side converter (RSC) and the stator is connected to grid via robust PLL (phase locked loop). The regulation is achieved below the synchronous speed (Hypo-synchronous mode). The implementation is realized using dSPACE1104 single board card control and acquisition interface. The obtained results of the proposed control present high performance in steady and transient states with low THD of the stator injected current to the grid (<5%).

Keywords : Doubly fed induction generator (DFIG), Field oriented control (FOC), Hysteresis current controller (HCC), Rotor side converter (RSC), dSPACE1104