Real Time Implementation of Grid-connection controlusing Robust PLL for WECS in Variable SpeedDFIG-based on HCC

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Abstract : This paper presents the experimental real timeimplementation 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 FOCHysteresisCurrent Controller (HCC) in Rotor side converter(RSC) and the stator is connected to grid via robust PLL (phaselocked loop). The regulation is achieved below the synchronousspeed (Hypo-synchronous mode). The implementation is realizedusing dSPACE1104 single board card control and acquisitioninterface. The obtained results of the proposed control presenthigh performance in steady and transient states with low THD ofthe stator injected current to the grid (<5%).

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