

Design and Analysis of Grid-Interactive DFIG Based WECS for Regulated Power Flow

This project will present the sharing of reactive power between two converters of a Doubly Fed Induction Generator (DFIG) based wind energy conversion system interacting with the grid. The Rotor Side Converter (RSC) control of DFIG is designed for sharing of reactive power at below rated wind speeds, which essentially reduces the amount of rotor winding copper loss. However, at rated wind speed, the RSC control is designed to maintain the unity power factor at stator terminals and to extract rated power without exceeding its rating. Further, the reduction in rotor winding copper loss due to reactive power distribution is demonstrated with an example. Moreover, the Grid Side Converter (GSC) control is designed to feed regulated power flow to the grid along with reactive power support to DFIG and to the load connected at point of common coupling. Moreover, the GSC control is designed to compensate load unbalance and load harmonics. The battery energy storage connected at DC link of back-to-back converters, is used for maintaining the regulated grid power flow regardless of wind speed variation. The system is modelled and its performance is simulated under change in grid reference active power, varying wind speed, sharing of reactive power and unbalanced nonlinear load using Simpower Systems toolbox of MATLAB

Domain: Power Systems _ Hybrid Systems

Technology: Electrical