

Grid-Connected Doubly-Fed Induction Generator under Integral Backstepping Control Combined with High Gain Observer

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Abstract : In this paper, modeling and control of a grid connected 660KW Doubly-Fed Induction Generator wind turbine is presented. Stator flux orientation is used to realize active-reactive power decoupling to enable independent control of active and reactive power. The recursive Integral Backstepping technique is used to control generator speed to its optimum value and to obtain unity power factor. The controller is combined with High Gain Observer to estimate the mechanical torque of the machine. The most important advantage of this combination of High Gain Observer and the Integral Backstepping controller is the annulation of static error that may occur due to incertitude between the actual value of a parameter and its estimated value by the controller. Simulation results under Matlab/Simulink show the robustness of this control technique in presence of parameter variation.

Keywords : doubly-fed induction generator, field orientation control, high gain observer, integral backstepping control

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