"Indirect Current Controlled Doubly-Fed Induction Generator For Wind Energy Applications"

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CERTIFICATE

It is certified that **Mr. B SURESH Roll** No 12234, student of M.E**,** control and instrumentation, Department of Electrical Engineering, Delhi College of Engineering, has submitted the dissertation entitled **"*Indirect Current Controlled Doubly-Fed Induction Generator for Wind Energy Applications*** " under my guidance towards partial fulfillment of the requirements for the award of the degree of Master of Engineering (Control and Instrumentation Engineering).

This dissertation is a bonafide record of project work carried out by him under my guidance and supervision. His work is found to be outstanding and his discipline impeccable during the course of the project.

I wish him success in all his endeavors

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ABSTRACT

This thesis deals with the analysis, modeling, and current control of the doubly-fed induction generator (DFIG) for wind turbines. This report presents a new technique to control the stator voltage and frequency by controlling the rotor current in quadrature frame synchronized at rotor frequency. Another technique has been explored for extracting the maximum power from the generator. A single unit of wind energy system under investigation was doubly-fed induction generator (DFIG) controlled through two voltage source converters (VSCs) one in the rotor circuit dealing with slip power and the other on grid to control the flow of reactive power and for maintaining the THD of the generator currents under control. Grid side converter also responsible to regulate the dc bus voltage this controls the real power exchange only, whereas, rotor-side converter keep an eye over the stator voltage and frequency. The rotor circuit converters are operated to the extract the maximum power from the wind turbine and to maintain unity power factor at stator terminals. Description for the studied system is presented with the dynamic modeling equations and detailed illustrations for the control loops block diagrams. Simulation results for different operating conditions are also presented to illustrate the merit of the proposed technique. The presented, simulation results demonstrate the effectiveness of the control technique. The performance of proposed system is analyzed using simulations with MATLAB/SIMULINK.

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