

## SMALL SIGNAL STABILITY ANALYSIS OF VARIABLE SPEED WIND ENERGY CONVERSION SYSTEM EQUIPPED WITH DFIG

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### ABSTRACT

This paper presents the modelling and stability analysis of grid connected variable speed wind energy conversion system (WECS) equipped with doubly fed induction generator (DFIG). The WECS of 10 MVA comprises a wind turbine coupled to grid connected DFIG with a back-to-back converter in the rotor circuit. A sixth order state variable model of the complete system is deduced from the linearized voltage, flux linkage and torque equations. The derived model is used to study the stability of the system when it is perturbed about the operating point. Power system block set in Matlab/Simulink software is used for the simulation of the system. Participation factors are used to identify different modes of oscillations. It is shown that the change in transmission line impedance affects the stability of the system. The results show that the developed model has sufficient accuracy for representation of the electromechanical dynamics of the DFIG based systems.