

Modeling and Analysis of DFIG Based Wind Power System Using Instantaneous Power Components

Authors : Jaimala Ghambir, Tilak Thakur, Puneet Chawla

Abstract : As per the statistical data, the Doubly-fed Induction Generator (DFIG) based wind turbine with variable speed and variable pitch control is the most common wind turbine in the growing wind market. This machine is usually used on the grid connected wind energy conversion system to satisfy grid code requirements such as grid stability, fault ride through (FRT), power quality improvement, grid synchronization and power control etc. Though the requirements are not fulfilled directly by the machine, the control strategy is used in both the stator as well as rotor side along with power electronic converters to fulfil the requirements stated above. To satisfy the grid code requirements of wind turbine, usually grid side converter is playing a major role. So in order to improve the operation capacity of wind turbine under critical situation, the intensive study of both machine side converter control and grid side converter control is necessary. In this paper DFIG is modeled using power components as variables and the performance of the DFIG system is analysed under grid voltage fluctuations. The voltage fluctuations are made by lowering and raising the voltage values in the utility grid intentionally for the purpose of simulation keeping in view of different grid disturbances.

Keywords : DFIG, dynamic modeling, DPC, sag, swell, voltage fluctuations, FRT

Conference Title : ICEE 2015 : International Conference on Electrical Engineering

Conference Location : Vancouver, Canada

Conference Dates : August 06-07, 2015