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Improving the Stability of a Distribution System Embedded with Wind Turbine Induction Generators Using STATCOM

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Abstract

This paper deals with stability improvement of a distribution system embedded with wind turbine induction generators (WTIGs), by using a Static Synchronous Compensator (STATCOM). The dynamic behavior of a distribution system, during an external three-phase fault and under various types of wind speed changes, is investigated. The study is carried out by three-phase, non-linear, dynamic simulation of distribution system component models. Simulation results are presented for two control strategies of STATCOM (namely the voltage and the var control mode), and four types of wind speed changes. Simulation results show that the var control mode is more effective in maintaining the stability and the WTIGs remain connected to the distribution system, compared to the voltage controlled mode. Further, it is also noticed that, the voltage control mode of operation of the STATCOM, gives better voltage stability performance in the example distribution system compared to the var control mode of operation.

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