

Experimental Investigation and Controller Development for Variable Speed Wind-Driven DFIG

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Abstract—This paper investigates the performance of wind-driven Doubly fed Induction Generator (DFIG) under sub-synchronous and super-synchronous speed. A simple controller for DFIG has been proposed using low cost 555 timer ICs, flip-flops and an IGBT inverter. The controller can be adjusts the frequency of inverter pulse to obtain a desired frequency despite the variations in the rotor speed of the DFIG. A prototype of the system has been built by fabricating the controller and a three-phase IGBT bridge inverter. The controller has been tested on a 4-pole, three-phase, 400V, 5kW, delta connected prototype machine driven by a DC motor under wide speed operation. The simplified steady state analysis of the system is presented. The results of the both calculated and experimental are furnished in the paper.

Index Terms—DFIG, IGBT bridge inverter, wind energy electric conversion system, power converters

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