Performance Study of Induction Generator Driven by Wind Turbine

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Abstract

This paper deals with the performance study of an induction generator when driven by a wind turbine for producing electrical energy. This was done by modeling both the induction generator and the wind turbine using Matlab program, and depending on the general theory of electrical machines. All previous elements helped in determining the optimal operation method for this system by studying together the mechanical characteristics of the wind turbine and operating characteristics of the induction generator.

Mechanical characteristics of a wind turbine (which represent the relation between the wind turbine torque and its axe speed during different wind velocities for all pitch angles of the turbine's blades) are represented using Matlab program. This facilitates the choice of a wind turbine with suitable power to the induction generator connected to it. The study and the results helped to determine the rated (nominal) operations point for such system.

Both the study and the model considered different ways for starting the system, using pitch control and comparing it to stall control for producing optimal electrical energy for different wind velocities.

Keywords: Induction Generator, Wind Turbine, Pitch Control, Stall Control

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