# Emulation of a Wind Turbine Using Induction Motor Driven by Field Oriented Control

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**Abstract :** This paper concerns with the modeling, simulation, and emulation of a wind turbine emulator for standalone wind energy conversion systems. By using emulation system, we aim to reproduce the dynamic behavior of the wind turbine torque on the generator shaft: it provides the testing facilities to optimize generator control strategies in a controlled environment, without reliance on natural resources. The aerodynamic, mechanical, electrical models have been detailed as well as the control of pitch angle using Fuzzy Logic for horizontal axis wind turbines. The wind turbine emulator consists mainly of an induction motor with AC power drive with torque control. The control of the induction motor and the mathematical models of the wind turbine are designed with MATLAB/Simulink environment. The simulation results confirm the effectiveness of the induction motor control system and the functionality of the wind turbine emulator for providing all necessary parameters of the wind turbine system such as wind speed, output torque, power coefficient and tip speed ratio. The findings are of direct practical relevance.