NEURO FUZZY BASED MAXIMUM POWER TRACKING CONTROL ALGORITHM IN WIND ENERGY CONVERSION SYSTEMS

I. ARUL[1], M.KARTHIKEYAN [2], N.KRISHNAN [3] & N.ALBERT SINGH [4]

[1]Research Scholar, Centre for Information Technology and Engineering, M.S University, Tirunelveli, India

[2]Prof & Head, Department of ECE, Tamilnadu College of Engineering, Coimbatore ,India.

[3]Prof. & Head , Centre for Information Technology and Engineering, M.S University, Tirunelveli, India

[4]Sub-Divisional Engineer, BSNL, Nagercoil, Kanyakumari (DT), India.

ABSTRACT

In this paper, a method of extracting the maximum power in a wind energy conversion system (WECS) is proposed, which adjusts the pitch angle of the wind turbine as well as control the grid side converter to attain maximum efficiency. The proposed neuro-fuzzy algorithm searches for the maximum power by varying the blade pitch angle in the desired direction and enhancement control of the system. The generator is operated in the speed control mode with the speed reference being dynamically modified in accordance with the magnitude and direction of change of active power. Wind turbines with double output induction generators can operate at variable speed permitting conversion efficiency maximization over a wide range of wind velocities. In order to maximize energy extraction from the wind, wind energy conversion systems (WECS) should be able to operate at variable rotational speed. The paper describes a variable speed wind generation system where neuro-fuzzy logic principles are used for efficiency optimization and performance enhancement control. A neuro-fuzzy controller tracks the generator speed with the wind velocity and adjust the pitch angle to extract the maximum power. A second neuro-fuzzy controller gives robust speed control against wind gust and turbine oscillatory torque. The complete control system has been developed, analyzed, and validated by simulation study using MATLAB/SIMULINK software.

KEYWORDS: Neuro-fuzzy algorithm, Wind energy conversion systems, MATLAB/SIMULINK