Power Quality Improvement Using Modified SVM Technique Method for NPC-MLI Fed Grid Connected Wind Energy System using Feed-forward Artificial Neural Network Controller Based Vector Control

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Abstract

This paper focuses on improving the performance of grid-connected Self-excited induction generator-based wind energy system (WES) with vector control method (VCM) using artificial neural network (ANN). A modified space vector modulation technique (MSVMT) has been presented to acquire the gate pulses for machine-side and grid-side multi-level NPC converters. The proposed model has been simulated with MATLAB/SIMULINK and the prototype model of the proposed grid-connected SEIG-based WES has been developed in the laboratory using WAVECT WCU300 FPGA R&D controller to validate its performance. During wind speeds step-change, the proposed MSVMT with ANN controller performs better than the conventional space vector modulation (CSVM) with PI Controller technique in terms of transient response, including overshoots, undershoots, ripples, and steady-state errors in rotor speed, torque, and power.

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