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Extreme learning machine based selected harmonic elimination for single phase inverters

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Abstract

In this study, a new system for the elimination of selected harmonics in single phase inverters is proposed. Extreme learning machine is used for the selected harmonic elimination system. The nonlinear equation set representing the inverter output voltage for the specific values of the modulation index is solved off line using Newton-Raphson method. The corresponding switching angles are obtained. The extreme learning machine is trained and tested with these modulation index and switching angles. Modulation index is used as an input to the extreme learning machine and switching signals are generated. A conventional carrier-modulator comparison process is used to produce switching instants in real time. The signals are applied to a single phase inverter feeding single phase load. Simulations are made using Matlab/Simulink and verified by experimental results. It was shown that the selected harmonics are eliminated from the load current and voltage for any given modulation index.

Keywords: Harmonic elimination, harmonic analysis, inverter, intelligent system, pulse width modulation.

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