

Power Quality Improvement Using Interval Type-2 Fuzzy Logic Controller for Five-Level Shunt Active Power Filter

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Abstract : This article proposes a five-level shunt active power filter for power quality improvement using a interval type-2 fuzzy logic controller (IT2 FLC). The reference compensating current is extracted using the P-Q theory. The majority of works previously reported are based on two-level inverters with a conventional Proportional integral (PI) controller, which requires rigorous mathematical modeling of the system. In this paper, a IT2 FLC controlled five-level active power filter is proposed to overcome the problem associated with PI controller. The IT2 FLC algorithm is applied for controlling the DC-side capacitor voltage as well as the harmonic currents of the five-level active power filter. The active power filter with a IT2 FLC is simulated in MATLAB Simulink environment. The simulated response shows that the proposed shunt active power filter controller has produced a sinusoidal supply current with low harmonic distortion and in phase with the source voltage.

Keywords : power quality, shunt active power filter, interval type-2 fuzzy logic controller (T2FL), multilevel inverter

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