

controllers. The results show the superiority and effectiveness of the proposed fuzzy controller in terms of eliminating harmonics, response time, and magnitude of source current during transient period. The THDi is significantly reduced of 2.12 % for fuzzy controller (with shunt APF) in conformity with the IEEE standard norms (THD <5%). The current source after compensation is sinusoidal and in phase with the line voltage source; the power factor is nearly equal to unity. Hence, the proposed fuzzy logic current controller is an excellent candidate to control shunt active filters based on multilevel inverter topology toward eliminating the harmonic currents and improving the power factor.

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APPENDIX

Abbreviations and symbols are listed below:

- (1) NPC. Neutral Point Clamped
- (2) DC. Direct current
- (3) PWM. Pulse Width Modulation
- (4) FLCs. Fuzzy logic controllers
- (5) THD. Total Harmonic Distortion
- (6) APF. Shunt active power