

Self-Tuning-Filter and Fuzzy Logic Control for Shunt Active Power Filter

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Abstract : Active filtering of electric power has now become a mature technology for reactive power and harmonic compensation caused by the proliferation of power electronics devices used for industrial, commercial and residential purposes. The aim of this study is to enhance the power quality by improving the performances of shunt active power filter in harmonic mitigation to obtain sinusoidal source currents with very weak ripples. A power circuit configuration and control scheme for shunt active power filter are described with an improved method for harmonics compensation using self-tuning-filter for harmonics identification and fuzzy logic control to generate reference current. Simulation results (using MATLAB/SIMULINK) illustrates the compensation characteristics of the proposed control strategy. Analysis of these results proves the feasibility and effectiveness of this method to improve the power quality and also show the performances of fuzzy logic control which provides flexibility, high precision and fast response. The total harmonic distortion (THD %) for the simulations found to be within the recommended imposed IEEE 519-1992 harmonic standard.

Keywords : Active Powers Filter (APF), Self-Tuning-Filter (STF), fuzzy logic control, hysteresis-band control

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