

PI, FUZZY AND NEURO CONTROLLED SHUNT ACTIVE POWER FILTERS FOR THREE PHASE FOUR WIRE SYSTEM WITH BALANCED, UNBALANCED AND VARIABLE LOADS

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Abstract

Widespread applications of power electronic-based loads continue to increase concerns over harmonic distortion. The Current harmonics produced by non-linear loads result in voltage distortion and leads to various power quality problems. Moreover these non-linear loads are not fixed and change randomly. However classic filters may not have satisfactory performance in such fast varying conditions. This paper presents a fuzzy and neuro controlled shunt active power filter used to compensate for harmonic distortion in three-phase four-wire systems. The shunt active filter employs a simple method for the calculation of the reference compensation current based on Fast Fourier Transform. This presented filter is able to operate in both balanced and unbalanced load and also for variable load conditions. A fuzzy and neuro based current controller strategy is used to regulate the filter current and hence ensure harmonic free supply current. The validity of the approach presented in harmonic mitigation is verified via simulation results of the proposed test system under different loading conditions.

Keywords : PI controller, Fuzzy controller, ANN controller, Power factor correction, Reactive power correction, Power quality improvement.