Comparative Analysis of Shunt Active Filter with PI controller and ANN based Controller

Abstract

Improving power quality has been the major research topic in last few decades due to flooding of semiconductor and other non-linear devices. The power quality of any source is determined by some indexes defined by international bodies such as harmonics factor, telephonic interference level (TIF) etc. Use different harmonic compensation schemes we must be able to meet those index limits. Power filters are widely used in modern electrical distribution systems to eliminate harmonic associated with it. The most popular technique that has been used is Active Power Filter (APF); The APF needs an accurate control algorithm that provides robust performance under source and load unbalances thus, compensation of harmonics depends largely on the algorithm adopted.

In this work both PI and ANN controller are used in three-phase shunt active power filter to compensate harmonics and reactive power produces by nonlinear loads to improve power quality is implemented for three-phase three wire systems. PI and ANN-based technique is implemented in shunt active power filters depending on the requirement of one of the controller,
used to produce controlled pulses required for IGBT inverter. The MATLAB program has been developed to simulate system operation. Various simulation results are presented in steady state condition and performance of PI and ANN controllers is compared. Simulation result obtained shows that performance of ANN controller found is better than PI controller.

References

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