Abstract

Shunt Active Power Filters studied in this report comprise power electronic devices made up of IGBT based PWM controlled voltage source converter. Three different controlling strategies for the control of shunt active power filters have been simulated in PSIM. At present, there is no unique set of power definitions valid for generic voltage and current waveforms. The calculation of electric power under nonsinusoidal conditions is perhaps the cornerstone of active power filter's analysis. A detailed discussion is given about various definitions of electric power and their interrelationships. The control algorithms developed for the active power filters make use of the concepts of instantaneous active and reactive power theory, synchronous reference frame theory and a novel but simple method of separation of harmonic currents method. All the strategies simulated in steady state as well as in transient states verify high dynamic response. Load harmonics have been compensated applying shunt active filter. The theory of active power filters has been summarized. Three different approaches of shunt active power filters have been proposed, discussed, and validated through simulation results analyzed in steady state as well as under transient condition. Finally a prototype has been developed to validate the simulation results of the "Instantaneous Reactive Power Theory" by implementing the same control algorithm in DSP (TMS320C2406 ).