

A series active power filter based on a sinusoidal current controlled voltage source inverter

Dixon, J. W., Venegas, G., & Moran, L. A. (1997). A series active power filter based on a sinusoidal current-controlled voltage-source inverter. *IEEE Transactions on Industrial Electronics*, 44(5), 612-620. <10.1109/41.633455> Accessed 28 May 2022.

Abstract

A series active power filter working as a sinusoidal current source, in-phase with the mains voltage, has been developed and tested. The amplitude of the fundamental current in the series filter is controlled through the error signal generated between the load voltage and a pre-established reference. The control allows an effective correction of power factor, harmonic distortion and load voltage regulation. Compared with previous methods of control developed for series active filters, this method is simpler to implement because it is only required to generate a sinusoidal current, in-phase with the mains voltage, the amplitude of which is controlled through the error in the load voltage. The proposed system has been studied analytically and tested using computer simulations and experiments. In the experiments, it has been verified that the filter keeps the line current almost sinusoidal and in-phase with the line voltage supply. It also responds very quickly under sudden changes in load conditions, reaching its steady-state in about two cycles of the fundamental.

Keywords

Active filters, Voltage control, Error correction, Power harmonic filters, Signal generators, Reactive power, Harmonic distortion, Computer errors, System testing, Computer simulation.