



Ramptime Current -Controlled APF for Harmonic Mitigation, Power Factor Correction and Load Balancing

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Abstract:

This paper presents a simulation for a shunt active power filter aimed at mitigation of harmonics, power factor correction and balancing of unbalanced three-phase system. The system consists of load fed through a six pulse bridge rectifier. The active power filter consists of a three-phase current-controlled voltage source inverter (CC-VSI) with a filter inductance at the ac output and a dc-bus capacitor. The CC-VSI is operated to directly control the ac source current to be sinusoidal and in phase with the ac source voltage. The inverter switching is controlled using ramptime current control being based on the concept of zero average current error (ZACE). The active power filter reference currents are generated using perfect harmonic cancellation (PHC) control method. The proposed filter successfully succeeded in reducing the total harmonic distortion (THD) to less than unity, correcting power factor to unity and balancing of unbalanced currents under sinusoidal and distorted supply voltages. The dynamic performance of the proposed filter is so fast to meet the dynamic load conditions.

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