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Three-Phase For-Wire Shunt Active Filter With Unbalanced loads

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Abstract

The electrical power quality at low voltage alternative networks became a serious concern because of the increased use of non-linear loads and pollutants. This work is to improve the quality of electric current in such networks. Four-Wire Shunt Active Filter is studied; deferent loads (balanced and unbalanced) are discussed. We propose to identify harmonic and reactive currents at the base of Self-Tuning-Filters, which proved very good filtering performance, either in transient or steady state. The simulations demonstrate the importance of this work in harmonic filtering and reactive power compensation.

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1. Introduction

Generally, harmonic currents are produced by power electronic equipment. These harmonic currents are the source of adverse effects for many types of equipment such as heating in distribution transformer and perturbation of sensitive control equipment.

Many solutions have been studied in the literature to mitigate the harmonic problems, such as the passive filters which cannot completely eliminate all of the harmonic currents, and the active filters which is developed and widely used to overcome to the drawbacks of the passive filters and improve power quality [1].

The identification approach is based on the Phase Locked Loop (PLL), which is not sensitive to the disturbances, specifically to the harmonic and unbalanced voltage [2], [3].

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