

**SIMULATION OF SINGLE PHASE HYBRID ACTIVE POWER  
FILTER TO REDUCE HARMONIC CURRENT IN NON LINEAR  
LOAD**

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## **ABSTRACT**

The past several years have seen a rapid increase of power electronics-based loads connected to the distribution system. These types of loads draw non sinusoidal current from the mains, degrading the power quality by causing harmonic distortion. This thesis proposes a single-phase hybrid active power. The proposed topology interconnects a passive band-pass filter in series with a shunt active power filter. The uniqueness of the proposed topology is the fact that it improves the harmonic filtering performance of a basic hybrid active power filter. The compensation current reference for the proposed topology is obtained by using the PWM controller techniques. This work describes the design of circuit topology, control system, combination of passive and active filter and control circuit to provide carrier signal. The system is verified by simulation using MATLAB/ Simulink simulation package. The simulation results show that the system effectively reduces the total harmonic distortion of the source current from 360.98 % to 2.3 %. The operating principles and simulation result are present.

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# CHAPTER 1

## INTRODUCTION

### 1.1 PROJECT OVERVIEW

With electronic equipment pervading most spheres of human activity, usage of uncontrolled or semi-controlled rectifiers has increased manifold. These rectifiers, which are rugged and inexpensive, convert alternating (ac) power from low voltage (220V/110V) electrical utility networks to unidirectional (dc) voltage, required for energizing electronic equipment. Harmonic currents are the source of adverse effects for many types of equipments such as heating in distribution transformer, perturbation of sensitive control equipments, malfunction of solid-state equipment, interference with communication systems and induction motors, as well as speeding up of energy meter[1]-[3]. Figure 1.1 show current distortions caused by non linear load .These harmonic currents are mostly generated by the power conversion units and the power electronic equipments. Many solutions have been studied in the literature to mitigate the harmonic problems, such as filtering (passive, active, and hybrid). Passive filters were traditionally configured with series resonant networks using passive elements, shown in figure1.2A