SINGLE PHASE RECTIFIER USING SINGLE SWITCH OF SHUNT ACTIVE POWER FILTER

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ABSTRACT

This paper presents the result of single phase rectifier system using shunt active power filter (APF) technique. The shunt APF is used to compensate the harmonic current components when a non-linear load is connecting to the rectifier. The technique involves injecting equal but opposite current to shape the distortion supply current to be sinusoidal and in-time phase with supply voltage. The boost rectifier circuit is employed as a shunt active power filter which consists of one power switch for cost minimizing as well as reducing switching losses. Computer simulation and hardware are presented in this paper.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Electronic equipment application such as single phase diode rectifiers has been important due to demands from industry application. These non-linear loads [7] contains of power switching devices appear to be prime sources of harmonic distortion. A non-sinusoidal current being drawn from the supply, containing harmful harmonic components which are then injected back to the supply system were creating various problems.

Various methods have been proposed to solve these problems. The conventional method of harmonic filtering is passive filter [3,4,6]. Among the more commonly used passive filter are the shunt LC filter and shunt low pass LC filter. They have some advantages such as simplicity, reliability, efficiency and cost [4]. However the harmonics problem is not solved because their performance is limited to a few harmonics and they can introduce resonance in the power system. Also, a separate filter is necessary for each harmonic frequency [4].

In recent years, various active power filter (APF) have been an effective way to compensate harmonics component in non linear load.[6]. Many studies have been carried out on various aspect of active power filter implementation [3,4,6,7]. APF can be connected in several power circuit configurations. In general, they are divided into three main categories, namely shunt APF, series APF and hybrid APF [3,4].