

# MECHATRONICS BOOK SERIES

## CONTROL AND INTELLIGENT SYSTEMS

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Momoh Jimoh E. Salami  
Abiodun Musa Aibinu  
Yasir Mohd Mustafah



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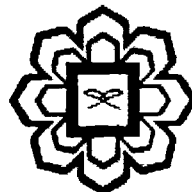
# CONTROL AND INTELLIGENT SYSTEMS

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**Momoh Jimoh E. Salami**

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**Yasir Mohd Mustafah**



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# Chapter 3

## Design and Development of controller of Active Power Filter for Industrial Usage part 2

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### 3.1 Introduction

Active filter performance fully depends on its control strategy. There are many existing methods for active filter control, research is still going on for a suitable control strategy. Most of the control strategies are involved with the harmonic detection. Conventional methods and their limitations are discussed briefly as follows (F. Csaki *et al.* 1980).

### 3.2 Active Filter Control

To find a simple and solution for active power filter, in this chapter, a new control technique has been adopted. Block diagram for this control is shown in Figure 3.1. A Sinusoidal Pulse Width Modulation (SPWM) is developed by comparing sine and triangular wave to get an output voltage of system frequency. The modulation index controls the shape and amplitude of the inverter output voltage. The digital value of sine wave is stored in controller ROM, and the magnitude of the sine wave is determined by the multiplication of sine wave with a variable term (multiplicand). This multiplicand (variable) term is extracted by comparing DC bus voltage of the inverter with a reference signal. This error signal (difference between the reference signal and the DC bus voltage) is processed by a Proportional, Integral and Derivative (PID) controller to get a stable signal. To find an appropriate modulation index, to maintain the DC bus voltage constant and to provide the reactive power required by the load, PID controller must tune properly.

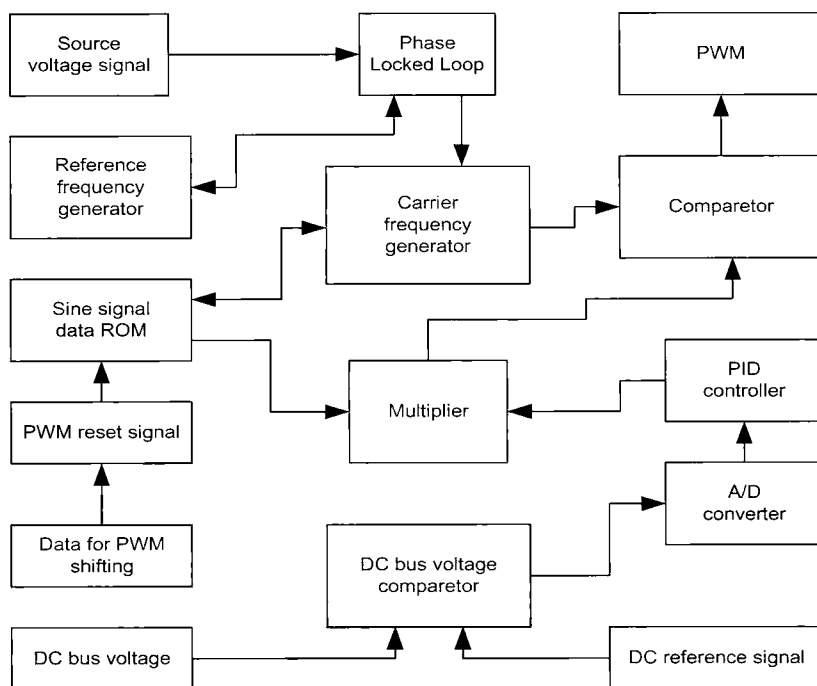


Figure 3.1: Simplified block diagram for the control of active power filter