PULSE WIDTH MODULATION (PWM) CONTROLLED VOLTAGE SOURCE INVERTER (VSI) FOR ACTIVE FILTERING APPLICATIONS

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ABSTRACT

Power conversion deals with the process of converting electric power from one form to another. The power electronic apparatuses performing the power conversion are called power converters. The power conversion is achieved using power semiconductor devices, which are used as switches. The power devices used are SCRs (or thyristor), triacs, power transistors, power MOSFETs, IGBTs, and MCTs (MOS-controlled thyristors). The power converters are generally classified as; AC-DC converters (phase-controlled converters), Direct AC-AC converters (cycloconverters), DC-AC converters (inverters), DC-DC converters (choppers, buck and boost converters). However the circuit that changes the characteristic of electrical energy from one form to another are tend to generate harmonic distortion in the supply source. Therefore the solution of this problem by using the active filters within the converter (rectifier-boost) or active filter external the converter (APF).

This paper presents a study of a voltage source inverter (VSI) suitable for use in active filtering applications. The model of the active filtering is simulated with the help of MATLAB/SIMULINK package. It employing sinusoidal pulse width modulation (SPWM) technique is given for evaluation and validation of the proposed concept.

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CHAPTER 1

INTRODUCTION

Power electronics is an established technology that bridges the power industry with its need for fast controllers, and the semiconductor industry with its attempt to produce devices with greater power handling capabilities. In essence, what power electronics does is to condition the power from a supply to suit the needs of the load. The main element of power electronics is the semiconductor switch [1].

Power electronics combine power, electronics, and control. Control deals with the steady state and dynamic characteristics of closed-loop systems. Power deals with the static and rotating power equipment for the generation, transmission, and distribution of electric power. Electronics deal with the solid-state devices and circuit for signal processing to meet the desired control objectives. Power electronics may be defined as the applications of solid-state electronics for the control and conversion of electric power.

Power electronics is based primarily on the switching of the power semiconductor devices. With the development of power semiconductor technology, the power handling capabilities and the switching speed of the power devices have improved tremendously.

The main task of power electronics is to control and convert electrical power from one form to another. Power electronics has applications that span the whole field of electrical power systems, with the power range of these applications extending from a few VA/Watts to several MVA/MW.