DESIGN AND SIMULATON OF SWITCHING CONTROLLER

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ABSTRACT

This thesis report presents a proposed design and simulation of switching controller by using operational amplifier or op amp. There are several applications of op amp in industrial such as amplifier, oscillator, regulators, rectification, computer interface and etc. From this list of application one of them is oscillator where the use of oscillator is to generate the required type of waveform such as sinusoidal, square, triangular, rectangular, saw-tooth, exponential, or other shape.

The purpose of the circuit design is to produce the pulse waveform

The simulation of the purposed design shows that the design can produce the required waveform, which can be used to trigger the electronic devices such as thyristor, triac and etc.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Controlled power switching devices can be used to regulate the power from unregulated source power efficiently. This technique is known as switching regulation. The devices themselves have evolved over the years from the mercury-arc tubes of the 1920s and 1930s, through the magnetic amplifier of the 1940s and 1950s to the power semiconductor devices of the 1960s and beyond [1]. The emphasis upon switching technique, as opposed to linear technique, relates to efficiency. As the switching characteristic of these semiconductor devices improve-lower saturation voltages, higher locking voltages, and faster transition times-power switching technique will assume increasing importance. Faster transition times permit higher switching frequencies resulting in smaller transformers, smaller filter components, and increased signal bandwidths. Although, combination of current or voltage sources and current or voltage outputs, as a practical matter, will concentrate on voltage-to-voltage conversion.

Switching regulation can take the form of alternating-current (ac) - direct-current (dc), ac-ac, dc-ac, or dc-dc. The ac-ac switching regulator may involve frequency conversion, or it may not. The familiar silicon-controlled rectifier (SCR) light dimmer circuit, shown in Figure 1.1, is an example of an ac-ac switching circuit that regulates the output voltages, by varying the phase-back angle α. The cycloconverter [2] is an example of a device, which directly converts ac of one frequency to ac of another frequency (which must be lower). However, most ac-ac converters involve the formation of an intermediary dc link. That is, they are really cascaded stages of ac-dc conversion (rectification) and dc-dc conversion (inversion).