SINGLE PHASE AC REGULATOR POWER ELECTRONIC TRAINER

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ABSTRACT

This report illustrates the design and development of variable pulse generator and AC regulator circuit that is suitable for the single phase regulator experiment used in power electronic laboratory. Two mode of AC regulator will be used they are single-phase half-wave AC regulator and single-phase full-wave AC regulator.

The design is based on Programmable Interface Controller (PIC) as the main processing unit. For triggering firing angle (α) of the thyristor a variable analog input is used to vary from 0^0 to 180^0 and interface with the Programmable Interface Controller (PIC) to produce variable pulse angle. The observation can be made through the waveform produced by the rectifier circuit where it is represent by mean voltage.

TABLE OF CONTENTS

CHAPTER 1
BACKGROUND OF THESIS

1.1 Introduction

Generally, the electrical engineering field may be divided into three areas of specialization whereas is electronics, power and control.

Electronics essentially deals with the study of the semiconductor of devices and circuits for the processing of information at lower power levels. The power area meanwhile deals with both rotating and static equipment for the generation, transmission, distribution and utilization of vast quantities of electrical power. And the control area deals with the stability and response characteristic of closed-loop system using feedback on either a continuous or sampled-data basis.

Power electronics deals with the use of electronics for the control and conversion of large amount of electrical power. The designs of power electronic equipments involve interactions between the source and the load, and utilize small signal electronics control circuits as well as power semiconductor devices.

Therefore, power electronics draws as well as depends upon all other areas of electrical engineering. The major component of the power electronics circuits is the thyristor. Therefore, power electronics relates to the thyristor circuitry, its design and the role in the control of power flow in a system. Thyristor is a fast switching semiconductor and its function is to modulate the power in AC and DC systems.

The power electronics circuits are also called as the thyristorised power controllers. These controllers are generally classified into the following five broad categories:

1. Phased controlled rectifiers