

RECTIFIER CONTROLLED BY FUZZY LOGIC CONTROLLER

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“IT IS BETTER IF YOU ARE APPROXIMATELY RIGHT THAN YOU ARE BEING
PRECISELY WRONG”.

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ABSTRACT

This paper presents a fuzzy logic controller for rectifier output voltage. A rectifier is a circuit that converts ac signal to dc signal. The used of fuzzy logic controller is based on the error of the output voltage and the differences between new error and present error. Fuzzy logic controller will improve the simulation performances. The sinusoidal phase width modulation (SPWM) was used as the switching pattern for the rectifier circuit. The modeling and simulation model of the rectifier is using MATLAB/Simulink with the Sim Power System Block set. Performances of the rectifier are compared between one input of fuzzy logic and two inputs.

Keywords : Sinusoidal Pulse Width Modulation, Controlled Rectifier, Insulated Gate Bipolar Transistor, Fuzzy Logic

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CHAPTER 1

INTRODUCTION

1.0 Background of the Project

Power electronics uses a solid-state electronics application involving control and conversion of electric power. The main task of power electronics is to control and convert electrical power from one form to another. Rectifier is one of them. Rectifier is a circuit that converts an ac signal into a unidirectional signal. A rectifier is a type of ac-dc converter. Depending on the type of input supply, the rectifiers are classified into two types:

- Single phase
- Three phase

Rectifiers are found in all dc power supplies that operate from an ac voltage source. A power supply is an essential part of each electronic system from the simplest to the most complex. Regulator is a circuit that maintains a constant dc voltage for variations in the input line voltage or in the load. Beside that rectifier can be added with filter to get a smoother dc voltage.

The simulations are presented using MATLAB/Simulink. For this project, MATLAB Fuzzy Logic Toolbox is used during the simulations to perform as a fuzzy logic controller to control the SPWM switching pattern by varying the amplitude of sinusoidal signal of the input.