

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

SPEED CONTROL OF A DC MOTOR

MAMA EVAGORAS

(E/1317)

JUNE 2003

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SPEED CONTROL OF A DC MOTOR

Submitted by EVAGORAS MAMA

Summary

The objective of this project is to illustrate how the speed of a DC motor can be controlled and making some experiments using thyristors controlled rectifiers in order to see the behavior of the motor in different firing angles.

In order to fulfill the objective the following approach was followed:

- Chapter 1: DC Motor. Description of the construction and operation of a DC motor.
- Chapter 2: Speed control of DC motor. Presented various methods of controlling the speed of various types of DC motors.
- Chapter 3: AC to DC phase controlled converters. A description on the operation of various AC to DC converters circuits (using thyristors) in order to show how the AC supply (single phase or three phase) is converted into a controllable DC voltage.
- Chapter 4: Experimental results. Show by presented experimental results how the speed of a DC motor can be controlled using thyristors rectifiers by varying the firing angle of the thyristors on load and unloaded.

Introduction

The DC motor is an attractive piece of equipment in many industrial applications requiring variable speed and load characteristics due to its ease of controllability. The control of the speed of a DC motor in now days can be done in various ways using resistors, power electronics circuits and etc.

This project is written with the objective of illustrating some of those methods that the speed of a DC motor can be controlled. The method that will be analysed further in the experimental part is the control of the armature voltage using a three phase AC to DC converter using thyristors. A description on the operation of various AC to DC converters circuits (using thyristors) used for the speed control will be performed, in order to show how the AC supply (single phase or three phase) is converted into a controllable DC voltage and to perform some experiments using a three phase thyristor rectifier in order to show how the motor behaves in different angles and loads. It further will explain the methodology use in order to obtain constant speed when the motor is loaded.