

**2-QUADRANT SINGLE-PHASE CONVERTER CONTROLLED DC MOTOR  
DRIVE**

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## **ABSTRACT**

This project is about 2-quadrant single-phase converter-controlled DC motor drive which uses power electronic equipment and closed-loop operation to control speed of the motor. In this project, PSIM and MATLAB are used to simulate the operation of converter and modelling of DC motor. A proportional-plus-integral (PI) controller is used as a speed regulator to obtain the electromagnetic torque. By using current controller, it can control the armature current to compute the suitable thyristor firing angle. This project also uses peripheral interface controller (PIC) as firing angle for the Thyristor Bridge.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Literature Survey on DC Drive

Direct current dc motor have variable characteristics are used extensively in a variable-speed drives because it can provide a high starting current and to obtain a wide range speed control. The methods of speed control are simpler and less expensive compare to ac drives [1].

Nowadays, dc motor plays an important role in modern industrial drives. Both series and separately-excited dc motors are normally used in variable-speed drives, but series motor is mostly used for traction application. Due to commutator, dc motors are not suitable for very high speed application and require more maintenance than ac motors. The ac motor drives are becoming increasingly competitive with dc motor drives with the recent advancement in power conversion, control technique and microcomputers [1].

#### 1.1.1 Speed Control

There are numerous applications where control of speed is required such as cranes elevators, machine tools, transit system and locomotive drives. DC motors are extensively used in many of these applications. Control of speed of the dc motors below and above the rated speed can easily achieved. The technology of speed control of dc motors has evolved considerably over the past quarter-century. A conventional method like Ward-Leonard system with rotating machines is used for speed control of dc motor. This system was introduced in the 1890s [2].