SINGLE PHASE INDUCTION MOTOR SPEED CONTROL

BY STATOR VOLTAGE CONTROL

(AC VOLTAGE CONTROLLER)

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ABSTRACT

Until recent years, numerous researches for motor drives focus on the three phase induction motor (TPIM) performance and is out of interest for the single phase induction motor (SPIM). The SPIM is commonly used at low power intensity since it has the uncomplicated construction and economic advantage. Electrical machine has both main winding and auxiliary winding in general. Typically, these windings are fed by only one single-phase source, and the speed of the motor is not controlled. Therefore this thesis establishes a speed control of single phase induction motor by stator voltage control. An AC voltage controller is proposed for the stator voltage control of single phase induction motor. It controls the motor speed by adjusting the thyristor firing angles. It is suitable to control speed adjustment of induction motor in compressors, blowers, fans, pumps and many other application. To verify the feasibility of this proposed speed control, simulation is carried out.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

There are generally two types of electrical motor that are commonly used in the industry nowadays which are AC motor and DC motor. The induction motor is used in a spacious variety of applications as a means of converting electrical power to mechanical work. It is without doubt that induction motor is the mainly and widely use machine in the industry.

Robust construction, reliable, moderately low manufacturing cost, simplicity of control and ease of maintenance have resulted in the induction motor being the most accepted of all electrical machines application. Pump, steel mill and hoist drives are the numerous applications of bulky three – phase induction motor (TPIM). Besides, there are relative less expensive to the equivalent size of synchronous motors or DC motors and the range in size from a few Watt to 10000 hp.

Whereas the DC motors and the synchronous motors required two excitation connections (Doubly Excited), the induction motor has only one excitation connection (Singly Excited). Both stator winding and rotor winding carry alternating current (AC) in the induction motor. The process of magnetic induction all the way through coupling with the singly excited winding established currents that will flow in the secondary winding of the induction motor; therefore the machine is called induction motor.