SPEED CONTROL OF THREE PHASE INDUCTION MOTOR USING PWM INVERTER

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ABSTRACT

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Pulse Width Modulation (PWM) technique to control the speed of three phase induction motor was analyzed. The induction motor is a type of AC motor whereby power is provided to rotor by technique of electromagnetic induction by way of. Controlling the speed of induction motor is mostly which in the motion industry appliances. PWM inverter control technique was used to vary the three phase induction motor speed by varying frequency applied to inverter for three phase induction motor. PWM is the efficient method of providing the quantity of electrical source between fully off state and fully on state. MOSFET and IGBT are used as the inverter switching element that provides a smooth way to control the frequency, voltage magnitude and current supply to the motor. Simulation on this method was carried out by using the software for simulation of power electronic and motor drive module called PSIM. Results obtained from the simulation indicated that PWM inverter is capable for controlling the speed of three phase induction motor.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Induction motors are the most widely used motors for appliances like industrial control, and automation; hence, they are often called the workhorse of the motion industry [1]. The induction motor may be operated as a motor and as a generator but it is rarely used as a generator delivering electrical power to the load since the performance are not purposely for certain of applications. There are two commonly used types of induction motor which are wound rotor type and squirrel rotor type.

Many industrial applications required several speeds or a continuously adjustable speed drive system. Traditionally a DC motor have been used the adjustable drive systems but DC motor are expensive, required periodic maintenance for commutators and brushes and also not prohibited in hazardous environment. Squirrel cage induction motors are cheap, rugged, no commutators and suitable for high speed applications. The availability of solid state controllers although more complex than used for DC motors, has made it possible to use induction motors in variable speed drive systems.

There are several techniques to control the speed of induction motor which are changing line frequency, changing number of poles, changing line voltage and changing the rotor resistance, slip frequency operation, closed loop control, constant flux operation, constant current operation and rotor slip energy recovery.

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