PULSE WIDTH MODULATION (PWM) INVERTER DRIVE OF THREE PHASE INDUCTION MOTOR

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ABSTRACT

This project presents a simple constant volt per hertz control, pulse width modulation for a three-phase inverter induction motor drive.

A regular sampling technique SPWM using xilinx FPGA controls the inverter. An implementation of this technique involves simultaneously adjustment of terminal voltage and supply frequency in order to achieve variable speed with constant torque.

Hardware and software design principles are outlined and discuss for xilinx FPGA. Experimental and computed results are presented for the motor control in steady state.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

Electric power is the muscle of modern industry and power electronics make its utilization smarter. The objective of power electronics is to improve the quality and utilization of electric power.

Power electronics have revolutionized the concept of power control for power conversion and for control of electric motor drives. Power electronics combine power, electronics and control. Control deals with the steady-state and dynamic characteristics of closed-loop systems. Power deals with the static and rotating power equipment for the generation, transmission, and distribution of electric energy. Electronics deal with the solid-state devices and circuits for signal processing to meet the desired control objectives. Power electronics may be defined as the application of solid-state electronics for the control and conversion of electric power. Power electronics are based primarily on the switching of the power semiconductor devices.

The converters system is comprised of switches, reactive components L, C, and transformers. A more general power converter system may contain more than one input source and one or more output variables. Converter operation involves the turning on and off of switches in a periodic sequence. The timing control is determined in many ways: externally, internally by states of circuit variables (voltages or currents) or by transitions or polarity inversions in the AC source waveform.

Since most of the motor in the industries are mainly induction type, development of this field took place rapidly [1]. Induction motor particularly squirrel-type induction motor, has a number of advantages when compared to