



اُنِيُوْزَسِيْتِي تِيكْنُوْلُوْجِي مَارَا
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DIRECT TORQUE CONTROL OF INDUCTION MOTOR USING ARTIFICIAL NEURAL NETWORK (ANN)

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ABSTRACT

This thesis present a direct torque control (DTC) using the space vector modulation technique which is applied to a three-phase inverter to control induction motor. The induction motor is modeled using space vector theory that describes the motor parameter in terms of d-axis and q-axis. The purposes of estimator or observer that represent the actual motor is to measure the flux and torque of the induction motor based on the current and voltages obtained from the induction motor.

AI technique is implemented to replace the conventional PI-controller and the outcome will be compared with the existing results in [4]. Simulation of the conventional and proposed controller will be presented as the final result.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The induction machine is the most rugged and widely variety used in application as a means of converting electric power to mechanical work. The induction machine can operate in two modes, motoring and generating. The induction machine is extensively used as a motor in many applications.

Before 1970, the machine had been operated in the constant frequency, constant voltage or in other words the machine is used as an uncontrolled electromechanical device. The adjustable speed drives only available for DC motors, mainly in the classic Ward-Leonard arrangement.

In industrial applications required several speed or a continuously adjustable of speed and DC motors have been used in adjustable speed. However due to the expensive, require frequent maintenance of commutator and brushes, and prohibitive in hazardous atmospheres, the induction motor is tried to replace the usage of the DC motor.

The development of variable-frequency converters based on power electronics devices such as thyristors, IGBTs, MOSFETs, BJTs and etc. made the speed control of induction motors become possible. The scalar control technique was the first and most popular method for speed control that consists of simultaneous adjustment of supply frequency and voltages. Then, several techniques were introduced, such as direct field oriented control (FOC), vector control and direct torque control.