DESIGN OF ARTIFICIAL INTELLIGENCE BASED SPEED ESTIMATOR FOR DC DRIVES.

This project report is presented in partial fulfillment for the award of the Bachelor in Electrical Engineering (Hons) of

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In the name of Allah

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ABSTRACT

This thesis describes the design of Artificial Intelligence Based speed estimator for separately excited DC motor using feedforward backpropagation method. The design is created using the MATLAB Toolbox. The training applied to the open loop and closed loop system. A comparison analysis of behavior was performed. The data from the closed loop DC motor with PID controller is used. The variable input data of armature voltage, armature current and output speed were collected by using simulation of the system. The training took only few minutes on a PC for the 30000 input-output training data . For this purpose, the Lavenberg-Marquardt back propagation algorithm was used. A standard three layer feed-forward neural network with tan-sigmoid (tansig) activation functions in the hidden layer and purelin at the output layer is used for this test. The result shows that by using only one hidden layer, minimum error can be obtained as what is needed and also excellent in result. It is satisfied that the application of ANN feed-forward back-propagation method in closed loop system, the speed obtained the excellent result. A comparison between the output of the motor using conventional method that ANN system is able together with PID controller . This was tested by training the system using minimum hidden nodes until reach at the optimum results for the closed loop step and also variable step function. The solutions to the parameter estimated speed for DC motor and without using the tancho generator, the speed of the DC motor can be measured. It is also increasing the realibility for the whole drive.

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CHAPTER 1

INTRODUCTION.

1.1 Introduction.

The design of Artificial Intelligence Based (AIB) estimator for separately excited dc motor using feedforward backpropagation and Artificial Neural Network (ANNs), are discussed in this work. PID controller drive and applying random test conditions different from those used to generate the training data. It is shown that it is an advantage of the AIB approach to estimator design that neither a conventional drive model nor a knowledge of any drive parameters are required and that an estimator of rotor speed can be obtained using only measurement of supply voltage and /or currents. Conventional approaches to the estimation of system states are generally model-based, estimator-based or observer-based and main techniques for development of speed-sensorless drive are estimators using monitored motor quantities or saliency effects, model reference adaptive systems and observes.

1.2 Objective.

The objective of this project is to design of Artificial Intelligence Based Speed Estimator using Feedforward Backpropagation Method for the DC Drives. The performance is also compared with PID

1.3 Scope of Works

Before starting the design, it is essential to understand and analyze the behavior of DC motor to be used in the design so that the design will follow the requirement needed in DC motor. When the analysis based on the equations related to DC motor has been done, the next step is to perform simulation works by using MATLAB-SIMULINK to obtain the input and the output data. These data are to be used in design Artificial Neural Network based speed estimator for DC Drives.