SYSTEM IDENTIFICATION OF PFC RECTIFIER CONTROLLER USING NON-LINEAR AUTOREGRESSIVE MOVING AVERAGE WITH EXOGENOUS INPUTS (NARMAX) MODEL

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ABSTRACT

In this project, the model structure selection of a Non-Linear Autoregressive Moving Average with Exogenous Input (NARMAX) identification of a Power Factor Correction (PFC) Rectifier Controller was performed by applying the Orthogonal Least Square (OLS) algorithm. The NARMAX model was introduced by Leontaritis and Billings (1985). The OLS estimation algorithm has been found to be an efficient tool for the estimation of non-linear systems. The tests that been performed based on the PFC Rectifier Controller dataset, show that the OLS has the potential to become an effective method to determine the NARMAX model structure in the system identification model.

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CHAPTER ONE

INTRODUCTION

1.1 OVERVIEW

A rectifier that converts an ac voltage to a unidirectional voltage is used as a dc power supply for many electronics circuits. A rectifier is also called an ac-dc converter. The rectifier normally employs diodes with capacitor filter at output. This results will in discontinuous and non-sinusoidal current being drawn from the supply system. This results, contributed the high total harmonic distortion (THD) of the supply current.

Therefore, in this work, the problem will be addressed and corrected so that the supply current in continuous, sinusoidal and in phase with the supply voltage. In this way, the proposed strategy will help to eliminate the harmonic distortions by improve the supply current waveform and correct the supply power factor to unity.

System identification is to determine a model that is equivalent to the identified system from a group of given models based on the past input and past output data to represent the process dynamics. Based on the past input and past output data, the future output data can be predicted.