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**EFFICIENCY OF A MICROCONTROLLER-BASED
PULSE WIDTH MODULATOR FOR HARMONICS REDUCTION**

A Dissertation Presented to
The Graduate School
Technological University of the Philippines

In Partial Fulfillment
Of the Requirement for the Degree
Doctor of Technology

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by

Jesusa N. Padilla

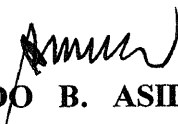
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APPROVAL SHEET

The dissertation attached hereto entitled ‘**Efficiency of a Microcontroller-based Pulse Width Modulator for Harmonics Reduction**’, prepared and submitted by **Jesusa N. Padilla**, in partial fulfillment of the requirements for the Degree of **Doctor of Technology**, is hereby accepted.


GISELA ROLLUQUI, PhD
 Adviser

For the Oral Examination Committee:



ORLANDO B. ASIDDAO, PhD
 Chairman


ROMULITA C. ALTO, EdD
 Member


RONALDO A. JUANATAS, PhD
 Member


MAY ROSE C. IMPERIAL, PhD
 Member

Accepted in partial fulfillment of the requirements for the Degree of **Doctor of Technology**.


PROF. JESUS MANALASTAS
 Dean 9-28-03

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ABSTRACT

This research presents new methods to realize a digitally-controlled Pulse Width Modulator (PWM) for harmonics reduction in computer systems. A general logical solution for PWM is implemented using a PIC 16F84 microcontroller. This solution provides a justification for the use of random and regular PWM techniques in reducing harmonics by virtue of varying switching schemes.

Specifically, opportunities for harmonics reduction in computer system by random and regular Pulse Width modulation techniques are investigated. Simulation and experimental results are given to verify efficiency of the microcontroller-based PWM design and implementation.

Based on the statistical tests conducted, the following results have been obtained:

- There is no significant difference between the number of harmonic counts of both regular and random sampled PWM.
- There is significant difference between the number of harmonic counts and 3rd/5th harmonics counts of both regular and random sampled PWM.
- There is no significant difference between the number of harmonic counts and 3rd/5th harmonics counts without the use of the prototype.

Based on the findings, the study forwards this conclusion:

The microcontroller-based PWM can effectively perform its function- to reduce 3rd/5th harmonics in computer systems.

The study recommends the following:

- To the other researchers who might be interested in this topic, study should be conducted regarding the use of other types of microcontroller.
- Due to its rugged design and reduced size, the microcontroller-based PWM can be installed directly to the power supply section of the central processing section of a desktop computer.

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