



Novel Memristor-based Wireless Communications Blocks

By

Nahla Elazab AbdEllatif Elashker

A Thesis Submitted to the

Faculty of Engineering at Cairo University

In Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Electronics and communication Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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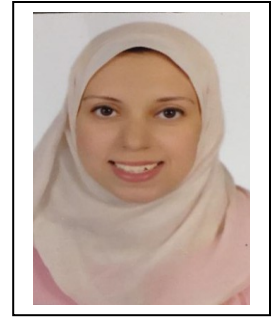
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Title of Thesis: **Novel Memristor-based Wireless Communications Blocks**

Key Words: Memristor, Demodulator, VCO, Phase Frequency Detector, Phase Locked Loop.

Summary:

The distinction of memristor device as being non-volatile, having nanoscale dimension, and CMOS compatible makes it a real alternative to CMOS device. In this context, the main objective of this thesis is to study the dependence of the memristor resistance on the initial phase of the applied periodic signal. Based on that, a set of building blocks for communication applications are designed, i.e. BPSK, QPSK, QAM, and BFSK demodulators. Next, memristor-based sinusoidal phase frequency detector, voltage controlled oscillator, and phase locked loop are presented.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Nahla Elazab AbdEllatif Elashker

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Dedication

This dissertation is lovingly dedicated to the spirit of my father, ***Elazab Elashkar***, who had always dreamed of completing my academic studies and to my mother, ***Aida Mohamed Othman*** for her praying to progress in my life.

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