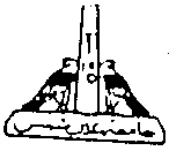


ON INTEGRODIFFERENTIAL EQUATIONS AND MATHEMATICAL MODELS IN POPULATION DYNAMICS

THESIS
Submitted For The Degree
OF
DOCTOR OF PHILOSOPHY (Ph.D.)
IN
Pure Mathematics

BY

SABAH HAFEZ ABDALLAH

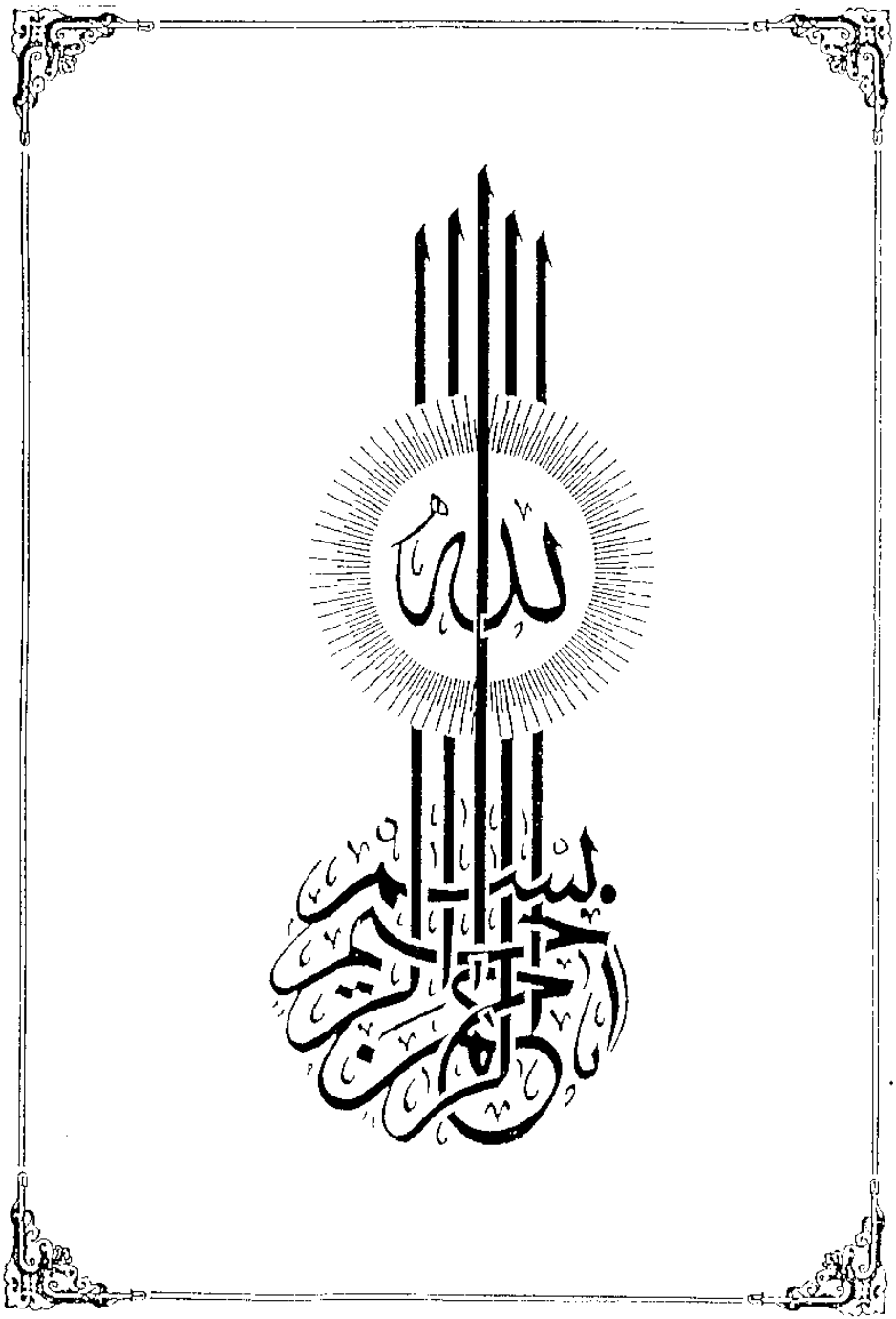
Mathematics Department
University College For Women
Ain Shams University

Supervised by

Prof. Dr. Soraya A.E. Sherif
Prof. of pure Mathematics
University College for Women
Ain Shams University

Prof. Dr. Afaf A.E.S. Zaghrout
Prof. of pure Mathematics
Faculty of Science (for Girls),
Al - Azhar University.

1995



Ain Shams University
University College for Women
Mathematics Department

Ph.D. Thesis (Pure Mathematics)

Title of Thesis

ON INTEGRODIFFERNTIAL EQUATIONS AND MATHEMATICAL MODELS IN POPULATION DYNAMICS

Thesis Supervisors

1. **Prof. Dr. Soraya Sherif ,**
Prof. of pure Mathematics,
University College for Women,
Ain Shams University

2. **Prof. Dr. Afaf A. Saleh Zaghrout,**
Prof. of pure Mathematics,
Faculty of Science (for Girls)
Al-Azhar University.

ACKNOWLEDGEMENT

I would like to express my sincerest thanks to Prof. **Dr. Soraya , A. E. Sherif** professor of pure mathematics, University College for Women, Ain shams University for suggesting the subject of the thesis, her valuable advice, continuous encouragement and for her helpful discussions which have improved the final form of this thesis.

I wish to express my deepest gratitude to my advisor **Prof. Dr. Afaf A. Saleh Zaghrout**, Professor of pure mathematics, Al - Azhar University for Girls, for proposing the points of research and planning the problems of this thesis. With her stimulating discussions, sincere advices, valuable suggestions and capable supervision, this work has been accomplished.

I also offer my grateful thanks to the staff members of the department of mathematics, University College for Women , Ain Shams University.

CONTENTS

Page

ABSTRACT

SABAH HAFEZ ABDALLAH. On integrodifferential equations and mathematical models in population dynamics. Unpublished Doctor of philosophy dissertations of pure mathematics , University College for, Women , Ain Shams University.

The main purpose of this dissertation is to improve results for the oscillations of neutral differential equations of odd order. Also some new comparison results are obtained.

A model of stage - structured population growth, where the age to maturity is state dependent, is investigated. The stability of positive equilibrium criteria is studied.

New necessary and sufficient conditions for all solutions of an integrodifferential equations to have at least one zero crossing is obtained. An application to a Logistic integrodifferential equation is discussed.

We introduce , new results for global asymptotic stability in a competition system of four competitive species modelled by autonomous delay integrodifferential equations are obtained . We also introduce sufficient conditions for persistence and stability of an autonomous integrodifferential system.

Key Words : Neutral differential equations, population dynamics, Logistic equations , oscillations, zero crossing , stage-structure, time delay, equilibrium, stability, asymptotic stability, persistence, Lyapunov functional.

SUMMARY