

**NEW NOTIONS OF GENERALIZED CLOSED SETS IN
FUZZY TOPOLOGICAL SPACES**

NURUL ADILLA FARHANA BT ABDUL WAHAB

**MASTER OF SCIENCE
UNIVERSITI MALAYSIA TERENGGANU**

2013

**NEW NOTIONS OF GENERALIZED CLOSED
SETS IN FUZZY TOPOLOGICAL SPACES**

NURUL ADILLA FARHANA BT ABDUL WAHAB

**Thesis Submitted in Fulfillment of the Requirement
for the Master of Science in the School of Informatics
and Applied Mathematics Universiti Malaysia
Terengganu**

September 2013

DEDICATION

I dedicate this thesis to my beloved father, Abdul Wahab bin Mat Saad and my mother, Norani binti Mohamed Nor and to all my siblings;

Mohd Farid Firdaus

Nurul Fitriah

Mohammad Fadhzi

Nurul Syakila

Nurul Aiesyah Zulaiqha.

This is for them who gave me the inspiration, support, motivation and encouragement.

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science.

NEW NOTIONS OF GENERALIZED CLOSED SETS IN FUZZY TOPOLOGICAL SPACES

NURUL ADILLA FARHANA BT ABDUL WAHAB

September 2013

Main Supervisor : Associate Professor Zabidin bin Salleh, PhD

School : Informatics and Applied Mathematics

By considering A as a set in a space of points X which is characterized by a membership function, $\mu_A(x)$, fuzzy sets and their properties are studied. Based on the concept of fuzzy set, Chang (1968) developed fuzzy topological spaces. In this thesis, two new notions of fuzzy generalized closed sets namely fuzzy θ -semi-generalized closed set and fuzzy θ -generalized semi-closed set are introduced. Moreover, some properties and characterizations of these two notions are obtained and the relationships among other notions from previous research are investigated. Counterexamples are shown if the implications of the relation are not true. Based on these two notions, new types of fuzzy separation axioms called fuzzy θ -generalized semi- $T_{1/2}$, fuzzy semi- θ - T_0 , fuzzy semi- θ - T_1 and fuzzy semi- θ - T_2 spaces are obtained. Various mappings are developed from these new notions such as fuzzy θ -semi-generalized continuity, fuzzy θ -generalized semi-continuity, fuzzy θ -semi*generalized continuity, fuzzy θ -semi-generalized irresolute mapping, fuzzy θ -generalized semi-irresolute mapping, fuzzy θ -semi-generalized closed mapping and fuzzy θ -generalized semi-closed mapping. Lastly, these new notions lead up to a

development of fuzzy homeomorphism namely fuzzy θ -semi-generalized homeomorphism and fuzzy θ -generalized semi-homeomorphism.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Master Sains.

**IDEA-IDEA BARU SET TERTUTUP TERITLAK DALAM RUANG
TOPOLOGI KABUR**

NURUL ADILLA FARHANA BT ABDUL WAHAB

September 2013

Penyelia Utama : Profesor Madya Zabidin bin Salleh, PhD

Pusat Pengajian : Informatik dan Matematik Gunaan

Dengan menganggap A sebagai suatu set dalam ruang bertitik X yang dicirikan oleh fungsi keahlian, $\mu_A(x)$, set kabur dan sifat-sifatnya dikaji. Berdasarkan konsep set kabur, Chang (1968) mengembangkan ruang topologi kabur. Dalam tesis ini, dua idea baru set teritlak kabur iaitu set tertutup θ -separa teritlak kabur dan set separa tertutup θ -teritlak kabur diperkenalkan. Tambahan pula, beberapa sifat dan pencirian kedua-dua idea diperolehi dan hubungan antara idea-idea lain daripada kajian sebelumnya dikaji. Contoh-contoh penyangkal ditunjukkan jika hubungan implikasi tidak benar. Berdasarkan kedua-dua idea ini, aksiom pemisahan kabur yang baru dikenali sebagai ruang θ -teritlak separa $T_{1/2}$ kabur, ruang separa- θ - T_0 kabur, ruang separa- θ - T_1 kabur dan ruang separa- θ - T_2 kabur diperolehi. Pelbagai pemetaan telah dibangunkan daripada idea-idea baru ini seperti keselantaran θ -separa teritlak kabur, separa keselantaran θ -teritlak, pemetaan ragu-ragu θ -separa teritlak kabur, pemetaan separa ragu-ragu θ -teritlak kabur, pemetaan tertutup θ -separa teritlak kabur dan pemetaan separa tertutup θ -teritlak kabur. Akhir sekali, idea-idea baru ini membawa kepada perkembangan homeomorfisma kabur iaitu homeomorfisma θ -separa teritlak kabur dan separa homeomorfisma θ -teritlak kabur.