UNIVERSITI TEKNOLOGI MARA

THE DOCTORAL RESEARCH ABSTRACTS

Volume: 9, Issue 9 April 2016

NINTH ISSUE

INSTITUTE of GRADUATE STUDIES

IGS Biannual Publication

3

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Title : Multiaspect Soft Sets and Its Generalizations

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The theory of soft sets introduced in 1999 by Molodtsov is an alternative mathematical tool for dealing with uncertainties. It basically deals with information representations of objects characterized by parameters which are defined over a single common universal set. Combinations of the theory with fuzzy sets and interval-valued fuzzy sets have resulted in the so-called fuzzy soft sets and interval-valued fuzzy soft sets. Various theoretical studies on these theories and the variants have been made, and applications of the theories in various areas particularly in the area of decision making are continuously explored. Soft sets, fuzzy soft sets and interval-valued fuzzy soft sets have greater potential in information representation should the universe sets of elements not be restricted to only a common universal set. Real life situations may involve descriptions of objects, situations or entities based on certain characteristics or attributes which may be associated with different sets of elements of different types of universal sets. In this thesis, we introduce the concepts of multiaspect soft set (MASS), multiaspect fuzzy soft sets (MAFSS) and multiaspect interval-valued fuzzy soft sets (MAIVFSS) which are generalizations of soft sets, fuzzy soft sets and interval-valued fuzzy soft sets, respectively. These concepts provide platforms for information representations that allow elements from different universal sets be taken into consideration in the description of a particular object, item or entity. MASS is defined for crisp data representation while MAFSS and MAIVFSS are respectively defined for fuzzy data representation with single and interval-valued membership degrees. For each concept, the set operations are established and the algebraic properties are studied. The concepts of mapping for multiaspect soft classes, multiaspect fuzzy soft classes and multiaspect interval-valued fuzzy soft classes are presented. In addition, we put forward the axiomatic definitions of distance, distance-based similarity measures and entropy for MAFSS and MAIVFSS. We introduce weighted and non-weighted distances and similarity measures based on the Hamming distance and the Euclidean distance. Relationships between the three measures are investigated. In the final part of the thesis, we highlight the applicability of some of the introduced concepts in solving group decision making problem under MAFSS and MAIVFSS environment.