GENERALIZED SET-THEORETIC OPERATIONS ON GENUINE SETS

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Dedicated to the memories of Prof. Dr. Doğan Çoker and Dr. Fikri Gökdal.

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Abstract
The determination of set-theoretic operations on genuine sets, other than the operations \( \subseteq^g, =^g, \cap^g \) and \( \cup^g \) presented in the author’s paper Genuine sets (Fuzzy Sets and Systems 105 (1999), 377-384), is proposed as an open question in his paper Some notices on genuine sets (Fuzzy Sets and Systems 110 (2000), 275-278). The present paper gives a desirable answer to this problem, and introduces a general technique for the construction of set-theoretic operations on genuine sets. Furthermore, two examples are designed to demonstrate two significant special classes of set-theoretic operations on genuine sets.

Keywords: Fuzzy sets, Fuzzy Logic, Various kinds of fuzzy set, Type-m fuzzy sets, Genuine sets.

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1. Introduction
The notion of genuine set was introduced in [2] with the aim of establishing a general theory of fuzzily defined objects. It was demonstrated in [4] that genuine sets can be used to describe various notions of fuzzy set; for example, intuitionistic fuzzy sets, interval valued fuzzy sets, type-m fuzzy sets, rough sets and fuzzy rough sets, within the same framework.

Not only do genuine sets unify various kinds of fuzzy set within the same framework, but they also allow us to model various kinds of uncertainties comprehensively [4]. A special interest to the topological aspects of genuine sets is paid in [1].

The set-theoretic operations play a significant role in the development of the theory of genuine sets. The criteria behind the selection of set-theoretic operations on genuine sets is introduced in [3], and the construction problem of set-theoretic operations other