RANK FUNCTIONS FOR CLOSED AND PERFECT [0, 1]-MATROIDS

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Abstract
In this paper we present the notions of perfect [0, 1]-matroid and closed [0, 1]-matroid, and investigate some of their basic properties. Moreover, we prove that a closed and perfect [0, 1]-matroid can be characterized by means of its [0, 1]-fuzzy rank function.

Keywords: Matroids, L-matroids, Perfect [0, 1]-matroids, Closed [0, 1]-matroids, Fuzzy rank functions.

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1. Introduction
Matroids were introduced by Whitney in 1935 as a generalization of both graphs and vector spaces. It is well-known that matroids play an important role in mathematics, especially in applied mathematics. Matroids are precisely the structures for which the very simple and efficient greedy algorithm works [1, 4]. In [6], Matroid theory was generalized to fuzzy fields by Shi, and L-fuzzy rank functions were studied. His approach to the fuzzification of matroids preserves many basic properties of crisp matroids, and L-matroids can be applied to fuzzy algebras and fuzzy graphs. Based on [6], the aim of this paper is to study the relation between a [0, 1]-matroid and its [0, 1]-fuzzy rank function.

In this paper, we obtain two results:

(1) There is a one-to-one correspondence between a closed and perfect [0, 1]-matroid and its [0, 1]-fuzzy rank function. That is, a closed and perfect [0, 1]-matroid can be characterized by means of its [0, 1]-fuzzy rank function.

(2) A [0, 1]-matroid (resp., a perfect [0, 1]-matroid, a closed [0, 1]-matroid) and its [0, 1]-fuzzy rank function are not in one-to-one correspondence in general.

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