Some Remarks of bipolar fuzzy graphs

Hossein Rashmanlou*

Young Researchers and Elite club, Central Tehran Branch, Islamic Azad University, Tehran, Iran

R. A. Borzooei

Shahid Beheshti University, Tehran, Iran

Abstract

In this paper, we discussed some properties of the $\mu-$complement of bipolar fuzzy graphs. Busy vertices and free vertices in bipolar fuzzy graphs are introduced and their image under an isomorphism are studied. Finally, we investigated some properties of isomorphism on bipolar fuzzy graphs.

Keywords: Bipolar fuzzy graphs, $\mu-$complement, busy vertex and free vertex
Mathematics Subject Classification [2010]: 05C99

1   Introduction

Presently, science and technology is featured with complex processes and phenomena for which complete information is not always available. For such cases, mathematical models are developed to handle various types of systems containing elements of uncertainty. A large number of these models is based on an extension of the ordinary set theory, namely, fuzzy sets. Graph theory has numerous application to problem in computer science, electrical engineering, system analysis, operations research, economics, networking routing, and transportation. In 1965 Zadeh [10] introduced the notion of a fuzzy subset of a set as a method for representing uncertainty. In 1975, Rosenfeld [4] introduced the notion of fuzzy graphs and proposed another definitions including paths, cycles, connectedness and etc. The complement of a fuzzy graph was defined by Mordeson and Nair [3] and further studied by Sunitha and Kumar [9].

In 1994, Zhang initiated the concept of bipolar fuzzy sets as a generalization of fuzzy sets. Bipolar fuzzy sets are an extension of fuzzy sets whose membership degree range is $[-1, 1]$. In a bipolar fuzzy set, the membership degree of an element means that the element is irrelevant to the corresponding property, the membership degree $(0, 1]$ of an element indicates that the element somewhat satisfies the property, and the membership degree $[-1, 0)$ of an element indicates that the element somewhat satisfies the implicit counter-property. The first definition of bipolar fuzzy graphs was proposed by Akram [1]. Rashmanlou et al. [2, 5, 6, 7] investigated bipolar fuzzy graphs with categorical properties, product of bipolar fuzzy graphs and their degree, domination in vague graphs and a study on bipolar fuzzy graphs.

---

*Speaker