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Chapter 1 : Fuzzy soft graphs with applications - IOS Press

fuzzy graph by taking fuzzy set of vertices and fuzzy set of edges. This concept of obtaining fuzzy sum of fuzzy colorings problem has a natural application in scheduling theory.

This is an open access article distributed under the Creative Commons Attribution License , which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Abstract A graph structure is a useful tool in solving the combinatorial problems in different areas of computer science and computational intelligence systems. In this paper, we apply the concept of bipolar fuzzy sets to graph structures. We introduce certain notions, including bipolar fuzzy graph structure BFGS , strong bipolar fuzzy graph structure, bipolar fuzzy -cycle, bipolar fuzzy -cut vertex, and bipolar fuzzy -bridge, and illustrate these notions by several examples. We study -complement, self-complement, strong self-complement, and totally strong self-complement in bipolar fuzzy graph structures, and we investigate some of their interesting properties. Introduction Concepts of graph theory have applications in many areas of computer science including data mining, image segmentation, clustering, image capturing, and networking. A graph structure, introduced by Sampathkumar [1], is a generalization of undirected graph which is quite useful in studying some structures including graphs, signed graphs, and graphs in which every edge is labeled or colored. A graph structure helps to study the various relations and the corresponding edges simultaneously. A fuzzy set, introduced by Zadeh [2], gives the degree of membership of an object in a given set. Zhang [3] initiated the concept of a bipolar fuzzy set as a generalization of a fuzzy set. A bipolar fuzzy set is an extension of fuzzy set whose membership degree range is. In a bipolar fuzzy set, the membership degree of an element means that the element is irrelevant to the corresponding property, the membership degree of an element indicates that the element somewhat satisfies the property, and the membership degree of an element indicates that the element somewhat satisfies the implicit counterproperty. Kauffman defined in [4] a fuzzy graph. Rosenfeld [5] described the structure of fuzzy graphs obtaining analogs of several graph theoretical concepts. Bhattacharya [6] gave some remarks on fuzzy graphs. Several concepts on fuzzy graphs were introduced by Mordeson et al. Dinesh [8] introduced the notion of a fuzzy graph structure and discussed some related properties. In this paper, we introduce the certain notions including bipolar fuzzy graph structure BFGS , strong bipolar fuzzy graph structure, bipolar fuzzy -cycle, bipolar fuzzy -cut vertex, and bipolar fuzzy -bridge and illustrate these notions by several examples. We present -complement, self-complement, strong self-complement, and totally strong self-complement in bipolar fuzzy graph structures, and we investigate some of their interesting properties. We have used standard definitions and terminologies in this paper. For other notations, terminologies, and applications not mentioned in the paper, the readers are referred to [1 , 5 , 7 , 14 â€” 18]. Preliminaries In this section, we review some definitions that are necessary for this paper. A graph structure consists of a nonempty set together with relations , which are mutually disjoint such that each is irreflexive and symmetric.

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Chapter 2 : Application of Bipolar Fuzzy Sets in Graph Structures

Application of Fuzzy Graph in Traffic blog.quintoapp.com, Abstractâ€" In this paper, we use a fuzzy graph model to represent a traffic network of a city and discuss a method to find the.

This is an open access article distributed under the Creative Commons Attribution License , which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Abstract Many problems of practical interest can be modeled and solved by using graph algorithms. In general, graph theory has a wide range of applications in diverse fields. In this paper, the intuitionistic fuzzy organizational and neural network models, intuitionistic fuzzy neurons in medical diagnosis, intuitionistic fuzzy digraphs in vulnerability assessment of gas pipeline networks, and intuitionistic fuzzy digraphs in travel time are presented as examples of intuitionistic fuzzy digraphs in decision support system. We have also designed and implemented the algorithms for these decision support systems. Introduction Graph theory is an extremely useful tool in solving combinatorial problems in different areas including geometry, algebra, number theory, topology, operations research, optimization, computer science, engineering, and physical, biological, and social systems. Point-to-point interconnection networks for parallel and distributed systems are usually modeled by directed graphs or digraphs. A digraph is a graph whose edges have directions and are called arcs edges. Arrows on the arcs are used to encode the directional information: Presently, science and technology are featured with complex processes and phenomena for which complete information is not always available. For such cases, mathematical models are developed to handle types of systems containing elements of uncertainty. A large number of these models are based on an extension of the ordinary set theory, namely, fuzzy sets. The notion of fuzzy sets was introduced by Zadeh [1] as a method of representing uncertainty and vagueness. Since then, the theory of fuzzy sets has become a vigorous area of research in different disciplines, including medical and life sciences, management sciences, social sciences, engineering, statistics, graph theory, artificial intelligence, signal processing, multiagent systems, pattern recognition, robotics, computer networks, expert systems, decision making, and automata theory. Fuzzy graph theory is finding an increasing number of applications in modeling real time systems where the level of information inherent in the system varies with different levels of precision. Fuzzy models are becoming useful because of their aim of reducing the differences between the traditional numerical models used in engineering and sciences and the symbolic models used in expert systems. Rosenfeld [4] introduced the fuzzy analogue of several basic graph-theoretic concepts and Bhattacharya [5] gave some remarks on fuzzy graphs. Mordeson and Nair [6] defined the concept of complement of fuzzy graph and studied some operations on fuzzy graphs. In [7], the definition of complement of a fuzzy graph was modified so that the complement of the complement is the original fuzzy graph, which agrees with the crisp graph case. Atanassov [8] introduced the concept of intuitionistic fuzzy relations and intuitionistic fuzzy graphs. Wu [12] discussed fuzzy digraphs. In this paper, the intuitionistic fuzzy organizational, neural network models, intuitionistic fuzzy neurons in medical diagnosis, intuitionistic fuzzy digraphs in vulnerability assessment of gas pipeline networks, and intuitionistic fuzzy digraphs in travel time are presented as examples of intuitionistic fuzzy digraphs in decision support systems. Algorithms of these decision support systems are also designed and implemented. Preliminaries A digraph is a pair , where is a finite set and. Let be two digraphs. The Cartesian product of and.

Chapter 3 : Fuzzy mathematics - Wikipedia

Presently, fuzzy graph theory has wide applications in engineering and social networks. Based on the applications, different types of fuzzy graphs are defined.

Chapter 4 : Novel Applications of Intuitionistic Fuzzy Digraphs in Decision Support Systems

Abstract. Let (V, Î¼, Ï•) be a fuzzy blog.quintoapp.com now provide two popular ways of defining the distance between a

pair of vertices. One way is to define the "distance" dis(x,y) between x and y as the length of the shortest strongest path between them.