Extension of some properties of fuzzy graph labelings in different types of graphs

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Objective

The objective of this research work is to investigate some properties based on vertex, edge, total, regular, irregular, totally regular, intrinsic, magic regarding fuzzy graph labelings like graceful, harmonious, intuitionistic, interval valued fuzzy graphs etc.

Description

Fuzzy set was initially introduced by Zadeh L.A. Later various researches added productive concepts to develop fuzzy sets theory like “Fuzzy graphs: In Fuzzy Sets and Their Applications” and “Order and Size in Fuzzy graph”. In 1987, Bhattacharya succeeded in developing the connectivity notions between fuzzy bridge and fuzzy cut nodes. A fuzzy graph contains many properties similar to crisp graph due to generalization of crisp graphs but it diverges at many places.

A crisp graph G is an order pair of vertex-set V and edge set E such that. In addition v=|V| is called order and e=|E|, size of the graph G respectively. In a crisp graph, a bijective function $\rho: V \cup E \rightarrow N$ that produces a unique positive integer (To each vertex and/or edge) is termed labelling in “Some results on magic graphs”. Having introduced the notion of magic graph where the labels vertices and edges are natural numbers from 1 to $/V/+|E|$ and the sum of the same must be constant in entire graph, “Super edge-magic graphs”. Extending the concept of magic graph adding a property that vertices always get smaller labels than edges which is named super edge magic labelling. Numerous other authors have explored diverse types of different magic graphs. The subject of edge-magic labelling of graphs had its origin in Kotzig and Rosa’s work on magic valuations of graphs. These labelling are currently referred to as either edge-magic labelling or edge-magic total labelling.

Fuzzy graphs are generalization of graphs. In graphs two vertices are either related or unrelated to each other. Mathematically, the degree of relationship is either 0 or 1. In fuzzy graphs, the degree of relationship takes values from [0, 1]. A fuzzy graph has ability to solve uncertain problems in a wide range of fields. The first definition of a fuzzy graph was introduced by Kaufmann in 1973. Azriel Rosenfield in 1975 developed the structure of fuzzy graphs and obtained analogs of several graph theoretical concepts. Nagoor Gani et. al. introduced the concepts of order and size of fuzzy graphs & fuzzy labelling graphs, fuzzy magic graphs. A fuzzy graph contains many properties similar to crisp graph due to generalization of crisp graphs but it diverges at many places.

Problem to be solved

This research aims at analysing and extending the general graph properties to various fuzzy properties satisfying the graph labelings in order to increase the accuracy of values for real world problems.

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