A.V.V.M. Sri Pushpam College (Autonomous)
Poondi– 613 503, Thanjavur-Dt, Tamilnadu
(Affiliated to Bharathidasan University, Tiruchirappalli – 620 024)

3.7.1 Number of Collaborative activities per year for research/ faculty exchange/ student exchange/ internship/ on –the-job training/ project work

Collaborating Agency:

Dr. K. R. Balasubramanian Assistant Professor, Department of Mathematics, H.H. Rajah's College, Pudukottai

Prof. P. SYAMALA

Assistant Professor
PG &Research Department of Mathematics
AVVM Sri Pushpam College (Autonomous)
Poondi-613 503, Thanjavur-Dt, Tamil Nadu.

Dr. K.R BALASUBRAMANIAN ,

Assisstant Professor of Mathematics
H. H. Rajah's College ,
Pudukkottai (Dt),
Tamil Nadu.

Date: 22 .08 2019

LINKAGE

For the year 2019-2020

Between

1. Prof. P. SYAMALA,
Assistant Professor,
PG & Research Department of Mathematics
A.V.V.M Sri Pushpam College
(Autonomous), Poondi – 613 503.

&

2. Dr. K. R. BALASUBRAMANIAN,
Assistant Professor of Mathematics
H.H. Rajah's College,
Pudukkottai (Dt),
Tamil Nadu.

Considering the significance of the noble cause for the student community, we have come forward to collaborate with each other to exchange research knowledge, expertise and library facilities to the process of scientific research and education in the field of materials science. The parties (mentioned above as 1. & 2.) have had preliminary discussion in this matter and have ascertained areas of broad consensus. The parties now therefore agreed to enter in writing these avenues of consensus, under a flexible linkage, and this project aims to fill the gap between knowledge demand and subject expertise related to the mentioned field.

Joint Responsibilities

- Sharing of Smart room with Computer Facilities, library resources.
- Joint Publication of research articles, books, magazines, bulletins etc.,
- Jointly organizing conferences, seminars, symposia and workshops.
- Submitting joint proposals for research funding from agencies like UGC, CSIR, DST and TNSCST.

Prof. P. SYAMALA

P. SYAMALA, M.Sc., M.Phil., SET., (Ph.D)
Assistant Professor of Mathematics,
A.V.V.M. Sri Pushpam College (Autonomous),
Poondi - 613 503, Thanjavur (Dt).

Dr. K. R. BALASUBRAMANIAN

Dr. KR. BALASUBRAMANIAN, Ph.D.,
Assistant Professor
Department of Mathematics
H.H. The Rajah's College (Au)
Pudukkottai - 622 001

Journal of The Gujarat Research Society

ISSN: 0374-8588
Volume 21 Issue 16s, December 2019

DIFFERENT TYPES OF EDGE SEQUENCE IN PSEUDO REGULAR INTUITIONISTIC FUZZY GRAPHS

P.SYAMALA[1] KR.BALASUBRAMANIAN[2]

Assistant Professor[1], Assistant Professor[2]
[1,2]Department of Mathematics,
[1]A.V.V.M. Sri Pushpam College,
Poondi, Thanjavur, Tamil Nadu, India.
[2]H. H. The Rajah's College,
Pudukkottai, Tamil Nadu, India.

Abstract

In this paper, different types of edge sequence in pseudo regular intuitionistic fuzzy graphs are obtained. The concept of connectivity plays an important role in both theory and applications of an intuitionistic fuzzy graphs. Depending on the strength of an edge, this paper classifies edge sequence of an intuitionistic fuzzy graph into different types. We analyse the relation between different types of edge sequence in both pseudo regular and totally pseudo regular intuitionistic fuzzy graphs. Also we identify strong edge sequence in pseudo regular intuitionistic fuzzy graph.

Keywords:*Pseudo regular intuitionistic fuzzy graph, Totally pseudo regular intuitionistic fuzzy graph, α – edge sequence, β – edge sequence, δ – edge sequence, strong edge sequence.*

1. Introduction

Fuzzy set theory was first introduced by Zadeh in 1965[19]. The first definition of fuzzy graph was introduced by Haufman in 1973 based on Zadeh's fuzzy relation in 1971. In 1975, A.Rosenfeld [16] introduced the concept of fuzzy graphs. Sunil Mathew and Sunitha [10] defined different types of arcs in fuzzy graphs and using them classified fuzzy graphs. Pathinathan and Jesintha Rosline [15] defined relationship between different types of arcs in both regular and totally regular fuzzy graph.Santhi Maheswari and Sekar [17] introduced on pseudo regular fuzzy graphs. Butani and Rosenfeld [2] have introduced the concept of strong arcs. Kalaiarasi[8] defined optimization of fuzzy integrated Vendor- buyer inventory models. In this paper, we introduced the concept of pseudo regular intuitionistic fuzzy graph, totally pseudo regular intuitionistic fuzzy graph and different types of edge sequence are discussed. Also a comparative study is made between pseudo regular and totally pseudo regular intuitionistic fuzzy graphs with reference to different types of edge sequence.

Perfectly Regular and Perfectly Edge-Regular Intuitionistic Fuzzy Graphs

P. Syamala, K. R. Balasubramanian

Abstract*: *A Perfectly regular intuitionistic fuzzy graph is an intuitionistic fuzzy graph that is both regular and totally regular. In this paper we introduce and classify these types of intuitionistic fuzzy graphs and study several of their properties, including how two classes of intuitionistic fuzzy graphs structurally relate to one another and several of their spectral properties such as isospectral intuitionistic fuzzy graphs and when the energy of intuitionistic fuzzy graph is proportional to the energy of their underlying crisp graphs. These properties are studied in particular due to having at least one constant function μ and γ.

Keywords*: *Intuitionistic fuzzy graph, perfectly regular, perfectly edge regular intuitionistic fuzzy graph, Graph energy. Spectral intuitionistic fuzzy graph theory, Intuitionistic fuzzy matrix.

I. INTRODUCTION

Regular and totally regular fuzzy graphs were first introduced in [5]. The fuzzy edge analog of these concepts, edge regularity and total edge-regularity, were introduced and studied in [18]. These concepts of regularity for both vertices and edges in fuzzy graphs led to many advancements in the structural theory of fuzzy graphs. Several relevant marquee results stemming from this research include [1,3,4,6,8-17,19-23,25-30].

The purpose of this paper is to prepare for a study of those intuitionistic fuzzy graphs that concurrently exhibit both intuitionistic fuzzy vertex and edge-regular properties. These graphs will eventually help link certain intuitionistic fuzzy systems and crisp systems, allowing for greater ease in computing properties of these fuzzy systems for modeling purposes [2] or optimizing these fuzzy networks [7]. We first study perfectly regular intuitionistic fuzzy graph which are both edge regular and totally edge-regular. Spectral properties of these classes of intuitionistic fuzzy graphs in particular will help relate notions of regularity in intuitionistic fuzzy graphs to crisp graphs, thus allowing for a deeper understanding of these special classes of intuitionistic fuzzy graphs.

Perfectly regular intuitionistic fuzzy graphs will be characterized in section 3 along with several initial results on perfectly regular intuitionistic fuzzy graphs. A similar study of perfectly edge-regular intuitionistic fuzzy graphs will be given in section 4.

From there, we will study the combination of these properties in intuitionistic fuzzy graphs by first studying the relationships between perfectly regular and perfectly edge regular intuitionistic fuzzy graphs in section 5 and then by providing a study of their adjacency matrices in section 6. The intention of this body of work is to serve as the necessary preliminaries for the introduction and study of those intuitionistic fuzzy graphs which are both exhibiting concurrently constant function μ and γ including those intuitionistic fuzzy graphs which are both perfectly regular and perfectly edge – regular. For an introduction to fuzzy graph theory and its basic definition, the reader is referred to [8]. For analysis notations and relevant limit theorems, the reader is referred to [24].

II. PRELIMINARIES

Definition 2.1

An intuitionistic fuzzy graph is of the form G = (V, E) where,

i) $V = \{v_1, v_2, \ldots \ldots, v_n\}$ such that $\mu_1 : V \to [0,1]$ and $\gamma : V \to [0,1]$ denotes the degree of membership and non-membership of the element $v_i \in V$ respectively and

$$0 \le \mu_1(v_i) + \gamma_1(v_i) \le 1 \ \forall v_i \in V \qquad (i = 1, 2 \ldots n) \to (1)$$

ii) $E \subseteq V \times V$ where

$\mu_2 : V \times V \to [0,1]$ and $\gamma_2 : V \times V \to [0,1]$ are such that

$$\mu_2(v_1, v_2) \le \min\{\mu_1(v_1), \mu_1(v_2)\} \qquad \to (2)$$

$$\gamma_2(v_1, v_2) \le \max\{\gamma_1(v_1), \gamma_1(v_2)\} \qquad \to (3)$$

and

$$0 \le \mu_2(v_1, v_2) + \gamma_1(v_1, v_2) \le 1 \ \forall (v_1, v_2) \in E \ (1, 2, \ldots\ldots n) \to (4)$$

Definition 2.2

The degree of a vertex in an intuitionistic fuzzy graph is $d(v) = (d_\mu(v), d_\gamma(v))$ where

$d_\mu(v) = \sum_{u \neq v} \mu_2(u, v)$ and

$d_\gamma(v) = \sum_{u \neq v} \gamma_2(u, v)$

Definition 2.3

The total degree of a vertex in an intuitionistic fuzzy graph is $td(v) = (td_\mu(v), td_\gamma(v))$ Where

$td_\mu(v) = d_\mu(v) + \mu_1(v)$

and $td_\gamma(v) = d_\gamma(v) + \gamma_1(v)$.

Definition 2.4

A regular intuitionistic fuzzy graph is an intuitionistic fuzzy graph with if all vertices have same degree.

Definition 2.5

A totally regular intuitionistic fuzzy graph is an intuitionistic fuzzy graph if all vertices have same total degree.

DISTANCE IN INTUITIONISTIC FUZZY GRAPHS

P.SYAMALA[1] KR.BALASUBRAMANIAN[2]

Assistant Professor[1], Assistant Professor[2]

[1]A.V.V.M Sri Pushpam College (Autonomous) Poondi

Thanjavur– 613 503

[2]Department of Mathematics, H. H. Rajah's College,

Pudukkottai, Tamil Nadu, India.

Email: [1]syam.rethinam87@gmail.com

Email: [2]n.ap.tamilpiththan@gmail.com,

Abstract:

In this paper we introduce a concepts of distance in intuitionistic fuzzy graphs which is a metric in a intuitionistic fuzzy graphs. Based on this metric the concepts of eccentricity, radius, diameter and centered in intuitionistic fuzzy graphs are studied. Some properties of eccentric nodes, peripheral nodes and central nodes are obtained. Two other distance in intuitionistic fuzzy graphs are the maximum distance md (u,v) and the sum distance in intuitionistic fuzzy graphs sd (u,v). Several results and problems concerning these metrics are described.

Keywords:

Intuitionistic fuzzy graph, maximum and sum distance in intitutionistic fuzzy graph.

1. Introduction

In 1965 Lofti. A Zadeh [13] introduced a mathematical frame work to explain the concept of uncertainty in real life through the partication of a seminal paper. The theory of fuzzy graph was developed by Rosenfeld in the year 1975. F.Harary et al in [1] propose the concept of the dissimilarity characteristic of Husimi trees.

1

Available online at http://scik.org
J. Math. Comput. Sci. 10 (2020), No. 1, 136-149
https://doi.org/10.28919/jmcs/4311
ISSN: 1927-5307

ON LEXICOGRAPHIC PRODUCTS OF TWO INTUITIONISTIC FUZZY GRAPHS

P. SYAMALA[1], K.R. BALASUBRAMANIAN[2,*]

[1]Department of Mathematics, A.V.V.M. Sri Pushpam College, Poondi, Thanjavur, Tamil Nadu, India

[2]Department of Mathematics, H. H. The Rajah's College, Pudukkottai, Tamil Nadu, India

Abstract. In this paper, lexicographic products of two intuitionistic fuzzy graphs, namely, lexicographic min product and lexicographic max product which are analogous to the concept lexicographic product in crisp graph theory are defined. It is illustrated that the operations lexicographic products are not commutative. The connected effective and complete properties of the operations lexicographic products are studied. The degree of a vertex in the lexicographic products of two intuitionistic fuzzy graph is obtained. A relationship between the lexicographic min product and lexicographic max–product is also obtained.

Key words: connected intuitionistic fuzzy graph; effective and regular intuitionistic fuzzy graph; lexicographic min-product and lexicographic max - product.

2010 AMS Subject Classification: 05C72.

1. INTRODUCTION

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975. Later on Bhattacharya [1] gave some remarks on fuzzy graphs Operations on fuzzy graphs were introduced by Mordeson and Peng [3]. We defined the direct sum of two fuzzy graphs and studied its properties [8].

---

*Corresponding author

E-mail address: n.ap.tamilpiththan@gmail.com
Received September 22, 2019