A.P.C. MAHALAXMI COLLEGE FOR WOMEN

THOOTHUKUDI - 2

CRITERION 3

SSR CYCLE IV

RESEARCH, INNOVATIONS AND EXTENSION

3.3. Research Publication and Awards

3.3.2.1: Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year wise during last five years

To whomsoever it may concern

I hereby declare that the following details and documents are true to the best of my knowledge. They have been checked and verified.

3.3.2. Number of books, chapters and papers in conference proceedings

S. No	Academic Year	No. of Books	No. of Chapters	No. of Conference Proceedings	Total
1	2022-2023	23	25	43	91
2	2021-2022	09	16	19	44
3	2020-2021	14	10	25	49
4	2019-2020	16	15	29	60
5	2018-2019	02	06	06	14

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(Dr. K. SUBBULAKSHMI)
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INVITED TALKS

PRESENTED PAPERS

1. Dr.V.Maheswari - Average Total and Average Connected Domination on Anti Fuzzy Graph

Proceedings of ICAMMCT-2021

Average Total and Average Connected Domination on Anti Fuzzy Graph

V. Maheswari[1], U. Syedul Fahima[2]

[2]Research Scholar, Reg No: 20112012092003, Assistant Professor[1]
[1,2]A.P.C.Mahalaxmi College for Women, Thoothukudi-628002, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012, TamilNadu, India
[*]Corresponding Author mail address: [1]mahiraj2005@gmail.com, [2]fahimaumarali@gmail.com

Abstract

In this paper, we define the concept of average total and average connected domination on anti fuzzy graph. Also, we find the average total domination number and average connected domination number for some standard anti fuzzy graphs and obtain its related results on them.

Keywords

Anti Fuzzy graph, Domination, Average Domination, Total Domination, Connected Domination.

AMS Subject Classification: 05C72

1. Introduction

In 1975, Fuzzy graphs were introduced by A.Rosenfeld. In 2016, Anti Fuzzy graph was introduced by R.Seethalakshmi and R.B.Gnanajothi[7]. Further, R.Muthuraj and A.Sasirekha[5] developed the anti fuzzy graph theory and also introduced the domination on anti fuzzy graph[6]. The concept of average domination was introduced by Henning[1]. In this paper, we introduce the average total and average connected domination on anti fuzzy graph. Some theorems are discussed and obtained some of its related results.

2. Preliminaries

Definition 2.1[5]

A pair of functions $\sigma: V \to [0,1]$ and $\mu: V \times V \to [0, 1]$ with $\mu(a, b) \geq \sigma(a) \vee \sigma(b)$ for all a, b in V is called an **anti fuzzy graph** where V is a finite non empty set and $\vee$ denote maximum. It is denoted by $\mathcal{A}$.

Definition 2.2[5]

If the underlying graph $\mathcal{A}^*$ is complete and $\mu(a, b) \geq \sigma(a) \vee \sigma(b)$ for every (a, b) in E then the anti fuzzy graph $\mathcal{A}$ is called the **complete anti fuzzy graph**.

Definition 2.3

Every vertices and edges in an anti fuzzy graph $\mathcal{A}$ have same membership value then $\mathcal{A}$ is called **uninodal** anti fuzzy graph.

Definition 2.4[6]

If for every vertex $b \in V(\mathcal{A}) \setminus D$ then there exists a in D such that a is a strong neighborhood of b otherwise it dominates itself. Then the set $D \subseteq V(\mathcal{A})$ is said to be a

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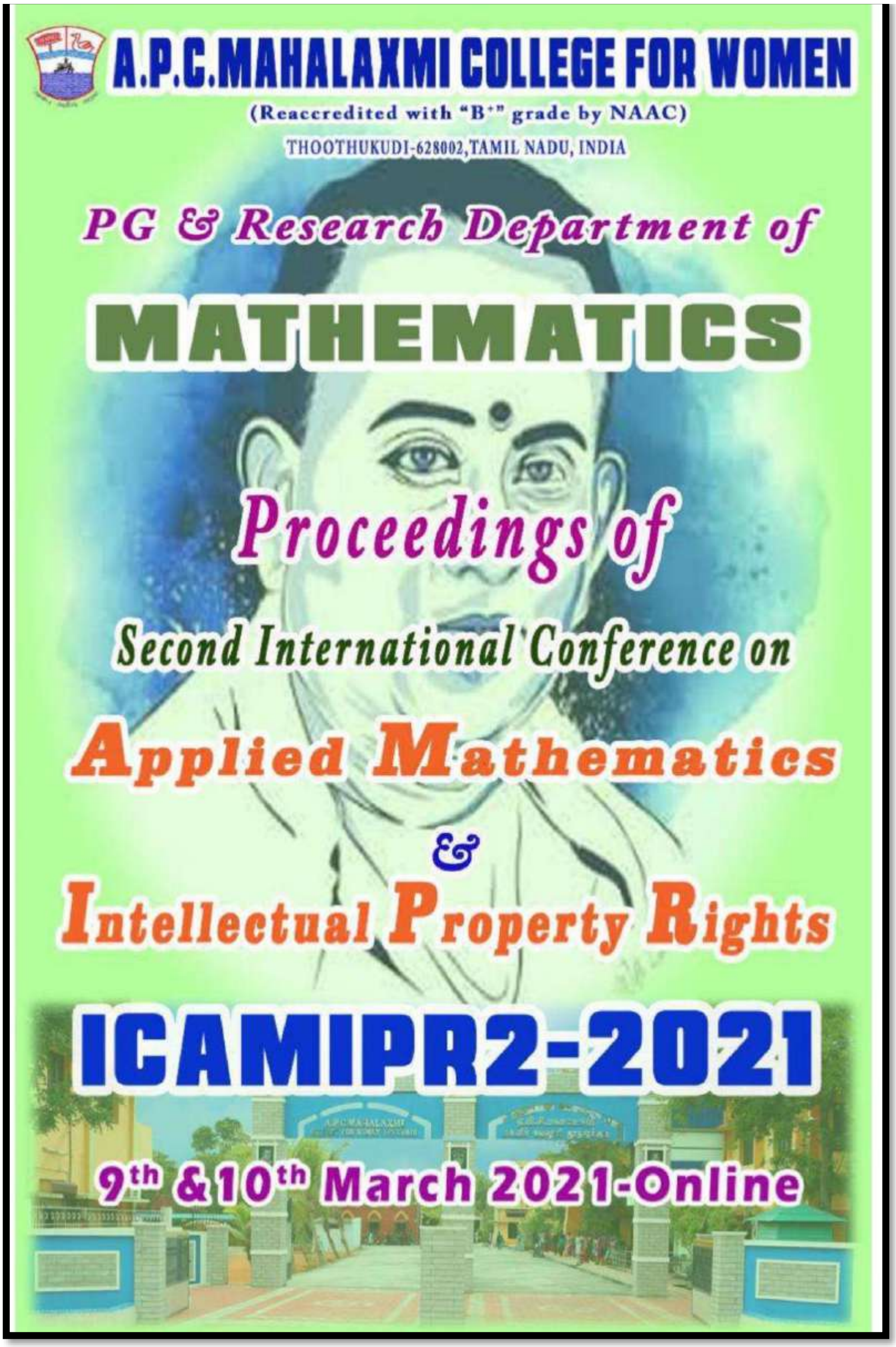


Research is an organized method for keeping you reasonably dissatisfied with what you have.
- Charles F. Kettering
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2. Dr. V. Maheswari - Ascending Domination Decomposition of a Triangular Snake

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 21

Ascending Domination Decomposition of Triangular Snake

[1]Brishni. V, [2]Maheswari. V

[1]Research Scholar (Reg. No: 19222012092002)
[2]Assistant Professor
[1,2]PG and Research Department of Mathematics, A.P.C.Mahalaxmi College for Women
Thoothukudi,Tamilnadu,India.
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli – 627012,TN,India

Abstract

K.Lakshmiprabha and K.Nagarajan introduced Ascending Domination Decomposition of Graphs**[4]**. M.Bhuvaneshwari, SelvamAvadayappan and P.Chandra Devi were introduced Ascending Domination Decomposition of some Graphs**[5]**.An ADD of a graph G is a collection $\Psi = \{G_1, G_2, \dots G_n\}$ of subgraphs of G such that each G_i is connected , every edge of G is in exactly one G_i and $\gamma(G_i) = i$, $1 \le i \le n$.Triangular Snake is obtained from the path by replacing every edge by a triangle C_3.In this paper, We proved the Triangular snake T_p admits ADD into n −parts iff $p = n(n+1)$ or $p = n^2$.

Keywords: Domination, Decomposition and Ascending Domination Decomposition.
AMS Subject Classification: $05C69$and $05C70$.

Introduction

Let $G = (V, E)$be a simple connected graph. K.Lakshmiprabha and K.Nagarajan introduced Ascending Domination Decomposition of Graphs**[4]**. M.Bhuvaneshwari, SelvamAvadayappan andP.Chandra Devi extended the concept of Ascending Domination Decomposition to some Graphs**[5]**. In this paper, We proved the Triangular snake T_p admits ADD into n −parts iff $p = n(n+1)$or $p = n^2$.

1.Preliminaries

Definition 1.1.

If $G_1, G_2, G_3, \dots, G_n$ are connected edge disjoint subgraphs of $G$with $E(G) = E(G_1) \cup E(G_2) \cup E(G_3) \dots \cup E(G_n)$, then $(G_1, G_2, G_3, \dots, G_n)$is said to be decomposition of G.

Definition 1.2.

A subset S of vertices in a graph G is called a Dominating set if every vertex $v \in V$ is either in S or adjacent to some vertex in S.

The least cardinality of a dominating set in $G$is called the domination number of G and is usually denoted by $\gamma(G)$.

Definition 1.3.

An ADD of a graph G is a collection $\Psi = \{G_1, G_2, \dots G_n\}$ of subgraphs of G such that

3. Dr. V. Mahalakshmi - Normalisation of Q-Fuzzy X-Subalgebras in Near Subtraction Semi groups

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 85

NORMALISATION OF Q-FUZZY X- SUBALGEBRAS IN NEAR-SUBTRACTION SEMIGROUPS

[1]V.Mahalakshmi, [2]K.Mumtha, [3]S. Hari Nachiyar
[1] Assistant Professor of Mathematics
[2]Research Scholar, Reg No: 20112012092002
[3]M.Sc Student
[1,2,3]A.P.C.Mahalaxmi College for Women, Thoothukudi.
Affliated to Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India.
[1]mahalakshmi@apcmcollege.ac.in, [2]mamthakasi8696@gmail.com,
[3]harishnarayanan99@gmail.com

Abstract:
The concept of normal fuzzy X-subalgebras in near-subtraction semigroups has been already examined in our previous paper. As a contintion to it, we, in this paper the concept of normalization of Q-fuzzy X-subalgebras in near-subtraction semigroups. We also try to explore some of its properties.

Key Words:
Q-fuzzy set, Fuzzy X-subalgebras, Normal.

Introduction

In 2007, Dheena et al. introduced the concept of *Near-Subtraction Semigroups*. In 1965, *fuzzy set* was first introduced by L.A.Zadeh . The notion of near-subtraction semigroup was studied by B.M.Schein. K.H.Kim et al. & they established the concept of fuzzy set. In 2001, K.H.Kim & Y.B.Jun analysed the theory *of normal fuzzy R-subgroups in near-rings*. In 2021, V.Mahalakshmi K.Mumtha et.al., discussed the concept of *normal fuzzy X-subalgebras in near-subtraction semigroups*In this paper, we introduce the new concept of *normal Q-fuzzy X-subalgebras in near-subtraction semigroups* and characterize some of its results.

Preliliminaries

Definition: 2.1

A *right near-subtraction semigroup* X is a non-empty set with "$-$" & "." satisfies:

(i). $(X,-)$ is a subtraction algebra
(ii). $(X,\ \cdot)$ is a semigroup
(iii). For all $p,q,r \in X,\ (p-q).r = p.r - q.r$ (right distributive law)

Definition: 2.2

If $p.0 = 0.p = 0$, for all $p \in X$, then X is a *zero-symmetric* and is denoted by X_0. Now after, X stands for a zero-symmetric right near-subtraction semigroup $(X,-,\cdot)$ with at least two elements.

Definition: 2.3

A *fuzzy subset* is the mapping μ from the non-empty set X into the unit interval [0,1].

Definition: 2.4

A fuzzy subset μ of X is called a *fuzzy Subalgebra* of X if $\mu(x-y) \geq \min\{\mu(x),\mu(y)\}, \forall x,y \in X.$

4. **Dr. V. Maheswari & Dr. K. Bala Deepa Arasi - Edge Domination on Anti Fuzzy Graphs**

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 92

EDGE DOMINATION ON ANTI FUZZY GRAPH

V. Maheswari[1], U. Syedul Fahima[2], K. Bala Deepa Arasi[3]
[2]Research Scholar,Reg No: 20112012092003
[1,2,3]PG & Research Department of Mathematics,
A.P.C.Mahalaxmi College for Women, Thoothukudi-628002
Affiliated to Manonmaniam Sundaranar University, Abishekapatti,Tirunelveli-627012
TamilNadu, India
[1]mahiraj2005@gmail.com, [2]fahimaumarali@gmail.com,[3]baladeepa85@gmail.com

Abstract:

In this paper, we introduce the concept of Edge domination on anti fuzzy graph. The edge dominating set, isolated edges and independent edge set on anti fuzzy graph are defined. We determine the edge domination number $\gamma'(\mathcal{A})$ on anti fuzzy graph. Some theorems are discussed and suitable examples are given.

Keywords:

Anti fuzzy graph, edge dominating set, isolated edges and independent edge set.

Introduction:

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975. R.Seethalakshmi and R.B.Gnanajothi introduced the definition of anti fuzzy graph. R.Muthuraj and A.Sasirekha defined some types of anti fuzzy graph. The study of dominating sets in graphs was started by Ore and Berge. A.Somasundram and S.Somasundaram [6] discussed domination in fuzzy graphs. R.Muthuraj and A.Sasirekha also defined domination on anti fuzzy graph in 2018[3].We discuss the edge dominating set, isolated edges and independent edge set on anti fuzzy graph and determine the edge domination number $\gamma'(\mathcal{A})$ on anti fuzzy graph.

1. Preliminaries:

1.1 Definition:

An **anti fuzzy graph** $\mathcal{A} = (\sigma, \mu)$ is a pair of functions $\sigma: V \to [0,1]$ and $\mu: V \times V \to [0, 1]$ with $\mu(u,v) \geq \sigma(u) \vee \sigma(v)$ for all u,v in V where V is a finite non empty set and $\vee$ denote maximum.

1.2 Definition:

An anti fuzzy graph $\mathcal{A} = (\sigma, \mu)$ is said to be **strong** if $\mu(u,v) = \sigma(u) \vee \sigma(v)$ for all (u,v) in E

1.3 Definition:

Let $\mathcal{A} = (\sigma, \mu)$ be an anti fuzzy graph. A set $S \subseteq E$ is said to be an **Edge Dominating Set(EDS)** in $\mathcal{A}$ for every edge in X-S is adjacent to atleast one effective edge in S.

An edge dominating set S is called the minimal edge dominating set if no proper subset S' of S is a dominating set.

The maximum fuzzy cardinality of minimal edge dominating set is called edge domination number of $\mathcal{A}$ and it is denoted by $\gamma'(\mathcal{A})$. (i.e)$|S|_{\mathcal{A}} = \sum_{e \in D} \mu(e)$.

5. Dr. V. Maheswari - Total Domination Polynomial on Some Special Graphs

Proceedings. Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women. Thoothukudi. 09 &10 March 2021 97

TOTAL DOMINATION POLYNOMIAL ON SOME SPECIAL GRAPHS

[1]V. Maheswari, [2]S. Shiny
[1]Assistant Professor, [2]II M.Sc Student,
[1,2]PG & Research Department of Mathematics,
A.P.C. Mahalaxmi College for Women, Thoothukudi, Tamilnadu, India.
[1]mahiraj2005@gmail.com, [2]shinysahay28@gmail.com

ABSTRACT

A set of vertices in a graph G(V,E) is called a dominating set if every vertex in V(G)-S is adjacent to some vertex in S. A dominating set S is called a total dominating set if S has no isolated vertex. The minimum cardinality of a total dominating set is called the total domination number and denoted by $\gamma_t(G)$. A total domination polynomial of a graph G of order n is the polynomial $D_{td}(G, x) = \sum_{t=\gamma_{td}(G)}^{n} d_{td}(G,t)\, x^t$ where $d_{td}(G,t)$ is the number of total dominating sets of G of cardinality t. In this paper we determine the total domination polynomial on some special graphs.

Keywords: total dominating set, total domination number, total domination polynomial.

AMS Subject Classification: 05C72

1. Introduction

All graphs considered here are finite, undirected without loops and multiple edges. Let G = (V, E) be a graph. A set of vertices in a graph is called a dominating set of G if every vertex in V – D is adjacent to some vertex in D. The domination number $\gamma(G)$ of G is the minimum cardinality of a dominating set in G. A set D of vertices in G is a total dominating set of G if every vertex of G is adjacent to some vertex in D. The total domination number $\gamma_t(G)$ is the minimum cardinality of total dominating set of G.Total domination in graphs was introduced by Cockayne et al. [3]. A domination polynomial of a graph G is the polynomial $D(G,x) = \sum_{t=\gamma(G)}^{n} d(G,t)x^t$, where $d(G,t)$ is number of dominating sets of G of cardinality t. Domination polynomial was initiated by Arocha et al.[1]. B. Chaluvaraju and V. Chaitra [2] defined the total domination polynomial as follows: A total domination polynomial of a graph G of order n is the polynomial $D_{td}(G,x) = \sum_{\gamma_{td(G)}}^{n} d_{td}(G,t)x^t$, where $d_{td}(G,t)$ is the number of total dominating sets of G of cardinality t. Let P_n be a path with n vertices. The comb graph is defined as $P_n \odot K_1$. It has 2n vertices and $2n-1$ edges. The n-sunlet graph is the graph on 2n vertices obtained by attaching n pendant edges to a cycle C_n(ie) the coronas $C_n \odot K_1$. The helm graph $H_n$is the graph obtained from an n- wheel graph by adjoining a pendant edge at each node of the cycle. Web graph is defined as the stacked prism graph with the edge of the cycle. The Friendship graph F_n can be defined by joining n copies of the cycle graph C_n with a common vertex. (ie) The Friendship graph F_n is one point union of n copies of cycle C_n. In this paper we determine the total domination polynomial for some special graphs.

6. Dr. V. Maheswari - Gd-Distance of Certain Product Graphs

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 102

Gd-distance of Certain Product Graphs

[1]V.Maheswari , [2]K.Thanga kanniga
[1]Assistant Professor, mahiraj2005@gmail.com
[2]Research Scholar, Reg.No.19122012092012, kannigaprasathkpk@gmail.com
[1],[2]PG and Research Department of Mathematics
A.P.C.Mahalaxmi College for Women, Thoothukudi, Tamilnadu, India
Affiliated to Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India.

ABSTRACT. In this paper, we determine the Gd-distance of $G\times K_{r_0,r_1,\ldots,r_{n-1}}$ and $G\boxtimes K_{r_0,r_1,\ldots,r_{n-1}}$ where $\times$ and $\boxtimes$ denote the tensor product and strong product of graphs, respectively, and $K_{r_0,r_1,\ldots,r_{n-1}}$ denotes the complete n-partite graph with partite sets $V_0, V_1, \ldots, V_{n-1}$ where $|V_j| = r_j, 0 \leq j \leq n-1$ and $n \geq 3$.

Keywords. Gd-distance, Tensor product, Strong product, Wiener index, Zagreb index.

1. INTRODUCTION

A graph G is a pair (V(G),E(G)) of sets, called the vertex set and edge set. Let G be a connected graph of order n. For vertices a,b∈V(G), the distance between a and b in G, denoted by $d_G(a,b)$, is the length of a shortest or geodesic (a,b)-path in G. Let $d_G(b)$ denotes the degree of the vertex b∈V(G). The length of a geodesic path is called geodesic distance or shortest distance. The number of edges of G is denoted as $\mathcal{E}(G)$.

Definition 1.1.[11] For any two simple graphs G and H, the tensor product of G and H has vertex set V(G×H)= V(G)xV(H), edge set E(G×H)={(a,b)(c,d)/ac ∈ E(G) and bd ∈ E(H)}.

Definition 1.2.[12] The Strong product G⊠H of graphs G and H has the vertex set V(G⊠H) = V(G)xV(H) and (a,x)(b,y) is an edge of G⊠H if

(i) a = b and xy ∈ E(H), or
(ii) ab ∈ E(G) and x = y, or
(iii) ab ∈ E(G) and xy ∈ E(H).

Definition 1.3. The Wiener index, introduced by Harry Wiener, is the first distance based topological index defined as

$$W(G) = \sum_{\{a,b\}\subseteq V(G)} d_G(a,b) = \frac{1}{2}\sum_{a,b\in V(G)} d_G(a,b).$$

Definition 1.4. The first Zagreb index $M_1(G)$ of a graph G is defined as

$$M_1(G) = \sum_{ab\in E(G)}[d_G(a) + d_G(b)].$$

Definition 1.5.[6] If a,b are vertices of a connected graph G, Gd-length of a a-b path is defined as $d^{Gd}(a,b) = d(a,b) + \deg(a) + \deg(b)$.

Definition 1.6.[7] If G is a connected graph with vertex set V(G), then the Gd-distance of G is defined as $d^{Gd}(G) = \sum_{\{a,b\}\subseteq V(G)}[d(a,b) + \deg a + \deg b]$.

Lemma 1.7. Let G be a nontrivial connected graph. Let Z_{ij} and Z_{pq} be two blocks in H = G×K. Then

(a) $d_H(Z_{ij}, Z_{iq}) = \begin{cases} 2r_j(r_j-1), & if\ j = q, \\ 2r_jr_q, & if\ j \neq q, \end{cases}$

7. Ms.P.Meenakshi & Dr.N.Meenakumari - On Generalized Pseudo Commutative Γ- Near Subtraction Semigroups

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 121

ON GENERALIZED PSEUDO COMMUTATIVE Γ- NEAR SUBTRACTION SEMIGROUPS

P. Meenakshi[1], N. Meenakumari[2]
[1]Research Scholar, Reg.No:18222012092002,
[2]Associate Professor
[(1,2)]PG & Research Department of Mathematics
A. P. C. Mahalaxmi College for Women, Thoothukudi, Tamil Nadu, India.
Affiliated to ManonmaniamSundaranar University, Abishekapatti,Tirunelveli-627012,Tamil Nadu, India.
[1] meena.bushy@gmail.com, [2] meenakumari.n123@gmail.com

Abstract:

In analogy with the concept of generalized pseudo commutative Γ-near-rings, we introduce the notion of generalized pseudo commutative Γ-near subtraction semigroups. We show that every pseudo commutative Γ-near subtraction semigroup is zero-symmetric. Further we obtain the properties of pseudo commutative Γ-near subtraction semigroups and some equivalent conditions on pseudo commutative Γ-near subtraction semigroups.

Keywords:

Non-zero nilpotent, regular, left unital, right unital, pseudo commutative, idempotent, central, strongly regular, zero-symmetric.

1.Introduction

Γ-near subtraction semigroup was introduced by Dr. S. J. Alandkar[2]. For basic terminology in near subtraction semigroup, we refer to Dheena[3] and for Γ-near subtraction semigroup, we refer to Dr.S.J.Alandkar[2]. In this paper we introduce the notion of generalized pseudo commutative Γ-near subtraction semigroups by admiring the concepts of generalized pseudo commutative Γ-near-ring.

2.Preliminaries

Definition 2.1 A Γ-near subtraction semigroup is a triple $(X, -, \gamma)$, for all $\gamma \in \Gamma$, where Γ is a non-empty set of binary operators on X, such that $(X, -, \gamma)$ is a near-subtraction semigroup for all $\gamma \in \Gamma$. In practice, we called simply Γ-near- subtraction semigroup instead of right Γ-near- subtraction semigroup. Similarly we can define a Γ-near- subtraction semigroup(left).

Definition 2.2 Let X and Y be two Γ- near subtraction semigroups. A map $f: X \rightarrow Y$ is said to be Γ- near subtraction semigroup homomorphism if i)$f(a-b) = f(a) - f(b)$ ii) $f(a\gamma b) = f(a)\gamma f(b)$ for all $a, b \in X, \gamma \in \Gamma$

Definition 2.3$X_0 = \{x \in X / x\gamma 0 = 0$ for all $\gamma \in \Gamma\}$ is called the zero-symmetric part of X. X is called zero-symmetric, if $X = X_0$.

Definition 2.4 An element $0 \neq a \in X$ is called nilpotent if there exists a positive integer $n \geq 1$ such that $(a\gamma)^n a = 0$ for each $\gamma \in \Gamma$.

8. **Ms.P.Meenakshi & Dr.N.Meenakumari - On Generalized Medial Γ- Near Subtraction Semigroups**

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 127

ON GENERALIZED MEDIAL Γ- NEAR SUBTRACTION SEMIGROUPS

P. Meenakshi[1], N. Meenakumari[2]
[1]Research Scholar, Reg.No:18222012092002,
[2]Associate Professor
[1,2]PG & Research Department of Mathematics
A. P. C. Mahalaxmi College for Women, Thoothukudi, Tamil Nadu, India.
Affiliated to Manonmaniam Sundaranar University, Abishekapatti,
Tirunelveli-627012, TamilNadu, India.
[1] meena.bushy@gmail.com, [2] meenakumari.n123@gmail.com

Abstract:

In analogy with the concept of generalized medial Γ-near-rings, we introduce the notion of generalized medial Γ-near subtraction semigroups. We show that the homomorphic image ofgeneralized medial Γ-near subtraction semigroup is again a generalized medial Γ-near subtraction semigroup Further we have studied the properties of regular generalized medial Γ-near subtraction semigroup.

Keywords:

Non-zero nilpotent, regular, left unital,leftpermutable, right permutable, zero-symmetric, regular generalized medialΓ-near subtraction semigroup, prime, completely prime, maximal ideal.

1.Introduction

Γ-near subtraction semigroup was introduced by Dr. S. J. Alandkar[2]. For basic terminology in near subtraction semigroup, we refer to Dheena[3] and for Γ-near subtraction semigroup, we refer to Dr.S.J.Alandkar[2]. In this paper we introduce the notion of generalized medial Γ-near subtraction semigroups by admiring the concepts of generalized medial Γ-near-ring.

2.Preliminaries

Definition 2.1 A Γ-near subtraction semigroup is a triple $(X, -, \gamma)$, for all $\gamma \in \Gamma$, where Γ is a non-empty set of binary operators on X, such that $(X, -, \gamma)$ is a near-subtraction semigroup for all $\gamma \in \Gamma$. In practice, we called simply Γ-near- subtraction semigroup instead of right Γ-near-subtraction semigroup. Similarly we can define a Γ-near- subtraction semigroup(left).

Definition 2.2 Let X and Y be two Γ- near subtraction semigroups. A map $f: X \to Y$ is said to be Γ- near subtraction semigroup homomorphism if i)$f(a - b) = f(a) - f(b)$ ii) $f(a\gamma b) = f(a)\gamma f(b)$ for all $a, b \in X, \gamma \in \Gamma$

Definition 2.3$X_0 = \{x \in X / x\gamma 0 = 0$ for all $\gamma \in \Gamma\}$ is called the zero-symmetric part of X. X is called zero-symmetric, if $X = X_0$.

Definition 2.4 An element $0 \neq a \in X$ is called nilpotent if there exists a positive integer $n \geq 1$ such that $(a\gamma)^n a = 0$ for each $\gamma \in \Gamma$.

Proposition 2.5X has no non-zero nilpotent elements if and only if $a\gamma a = 0$ implies $a = 0$ for all $\gamma \in \Gamma$.

9. Dr.M.Muthukumari - Fuzzy β* Convergence of Generalized Filter

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 138

FUZZY β* CONVERGENCE OF GENERALIZED FILTER

[1]M.Muthukumari, [2]M.Ramalakshmi
[1]Assistant Professor of Mathematics
[2] II Msc Mathematics.,
[1,2] PG & Research Department Of Mathematics,
A.P.C. Mahalaxmi College For Women, Thoothukudi,Tamilnadu, India.
Affiliated to Manonmaniam Sundaranar University
Abishekapatti, Tirunelveli, TamilNadu, India.
E-Mail-[1] mmkumari27@gmail.com , [2] ramyasan7@gmail.com

Abstract: In this paper, we introduce β* Convergence of Filter (Generalized filter) β* Convergence of Fuzzy filter (Fuzzy Generalized Filter) and study various properties.
Keywords: β* Convergence of filter, β* convergence of generalized filter, Fuzzy β* convergence of fuzzy filter, Fuzzy β* convergence of fuzzy generalized filter.

1. Introduction: In 1965, L.A.Zadeh introduced fuzzy sets. In 1968, C.L.Chang introduced fuzzy topological space. In 2011 S.Palaniammal and others introduced generalized filter and convergence of generalized filters. In 2014, myself and others introduced fuzzy filter and convergence of fuzzy filter.

In the year 1983, M.E.Abd El-Monsef, S.N.El-Deeb and R.A.Mahmoud introduced the concept of β open set in topological space. A subset A of a topological space is called β open set if if $A \subseteq cl(int(cl A))$. In 2020, myself introduced the concept of β* open set in generalized topological space. In this paper I introduce the concept of β* convergence of filter and fuzzy β* convergence of fuzzy filter.

2.Preliminaries:

Definition2.1:Filter: Let X be a non empty set. $F \subset P(X)$ is called a Filter on X if 1. $\Phi \notin F$; 2. F is closed under finite intersection. 3. $A \in F$ and $A \subset B \Rightarrow B \in F$.

Definition2.2: Generalized Filter (GF): Let X be a non empty set. $F \subset P(X)$ is called a generalized filter if 1. $\Phi \notin F$; 2. $A \in F$ and $A \subset B \Rightarrow B \in F$.

Definition2.3: Convergence of Filter: Let (X, T) be a topological space and F be a Filter on X. F is said to converge to $a \in X$, if F contains all neighbourhoods of a.

Definition2.4: Convergence of Generalized Filter: Let X be a topological space and F be a Generalized Filter on X. F is said to converge to $a \in X$, if F contains all neighbourhoods of a.

Definition2.5: Fuzzy Filter: Let X be a non empty set. A fuzzy set. $F: P(X) \to [0,1]$ is called Fuzzy Filter if 1. $F(\Phi) = 0$; 2. $F(A \cap B) \geq \min\{F(A), F(B)\}$ 3. $A \subset B \Rightarrow F(A) \leq F(B)$.

Definition2.6: Fuzzy Generalized Filter: Let X be a non empty set. A fuzzy set $F:P(X) \to [0,1]$ is called Fuzzy Generalized Filter if 1. $F(\Phi) = 0$; 2. $A \subset B \Rightarrow F(A) \leq F(B)$.

10. Dr. M. Muthukumari - New Types of closed sets in Generalized Topology

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 133

NEW TYPES OF CLOSED SETS IN GENERALIZED TOPOLOGY

[1]M.Muthukumari [2]T.Madhumidha
[1]Assistant Professor Of Mathematics
[2]II Msc Mathematics.,
[1,2]PG & Research Department Of Mathematics,
A.P.C. Mahalaxmi College For Women, Thoothukudi,Tamilnadu, India.
Affiliated to Manonmaniam Sundaranar University
Abishekapatti, Tirunelveli, TamilNadu, India.
E-mail: [1]mmkumari27@gmail.com, [2]madhumidha25499@gmail.com

ABSTRACT

In the year 2002, A.Csaszar introduced the concept of Generalized Topology [1]. In the year 1963, N.Levine introduced the concept of semi open sets [2] in a topological space. In the year 1983, Abd El-Monsef M.E., El-Deeb S.N. and Mahmoud R.A. introduced the concepts of β open sets [3] in a topological space. In this paper S* closed sets, β* closed sets and β*S* closed sets are introduced and properties are studied.

KEYWORDS: S* closed sets, β* closed sets and β*S* closed sets

1.PRELIMINARIES:

Definition 1.1: Generalized Topology

Let X be a non empty set. Let $\mu \subset P(X)$. μ is called a generalized topology on X if 1. $\Phi \in \mu$
2. μ is closed under arbitrary union. Elements of μ are called μ open sets or simple open sets. The interior of a set A is denoted by i(A).

Definition 1.2: Semi open set

A set $A\subset X$ is called a semi open set if $A\subset cl\ int\ A$.
Let $A\subset X$. The union of all semi open sets contained in A is called semi interior of A and it is denoted by $i_s(A)$. $i_s(A)=\cup\{B/B$ is semi open and $B\subset A\}$

Definition 1.3: β open set

A set $A\subset X$ is called a β open set if $A \subset cl\ int\ cl\ A$.Let $A\subset X$. The union of all βopen sets contained in A is called β interior of A and it denoted by $i_\beta(A)$.

Result 1.4: A is open⟹ A is semi open ⟹ A is β open

2.NEW TYPES OF CLOSED SETS:

Definition 2.1:S* Closed Set

Let X be a generalized topological space. Let $A \subset X$. A is called a S* closed set if for every semi closed set B containing A, there exists a closed set B^1 such that $A \subset B^1 \subset B$.
ie) $A\subset B$, B is semiclosed implies thereexistsB^1 a closed set such that $A \subset B^1\subset B$.

Definition 2.2: β* closed set

Let X be a generalized topological space. Let $A\subset X$. A is called a β* closed set if for every β closed set B containing A, there exists a closed set B^1 such that $A\subset B^1\subset B$.
ie) $A\subset B$, B is β closed implies there exists B^1 a closed set such that $A\subset B^1\subset B$.

Definition 2.3: β*S* closed set

Let X be a generalized topological space. Let $A\subset X$. A is called a β*S* closed set if for every β closed set B containing A, there exists a semi closed set B^1 such that $A\subset B^1\subset B$.
ie) $A\subset B$, B is β closed implies there exists a B^1 a semi closed set such that $A\subset B^1\subset B$.

Example 2.4:$X=\{a, b, c\}$ $T=\{\Phi, X\}$

11. Dr. K. Palani & Dr. N. Meenakumari - Total Energy of a Graph

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TOTAL ENERGY OF A GRAPH

K.Palani[1], M.Lalitha Kumari[2] & N.Meenakumari[3]
[1,3]Associate Professor, [1]palani@apcmcollege.ac.in
[2]Research Scholar, Reg.No: 20212012092007
[1,2,3]PG & Research Department of Mathematics,
A.P.C. Mahalaxmi College for Women, Thoothukudi-628002, TN, India
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012,TN, India.

Abstract:

In this article we introduce the concept of total matrix andtotal energy of a graph G. Let G=(V,E) be a (p,q) simple graph. Let $V(G) = \{v_i/i = 1,2, \dots p\}$ and $E(G) = \{e_i/i = 1,2, \dots q\}$. The total matrix $T = T(G)$ of G is a square matrix of order p+q whose (i,j)[th]entry is defined as:

$$T = (t_{ij}) = \begin{cases} 1 & if\, v_i adjacent to v_j, i \neq j \\ 1 & if\, e_i adjacent to e_j, i \neq j \\ 1 & e_i incident with v_j \\ 0 & otherwise \end{cases}$$

The Total Energy of a graph is the sum of absolute value of the eigen values of its Total matrix $T(G)$. For any (p,q) graph G, the total number of eigen value is p+q.

Let $\lambda_1, \lambda_2, \lambda_3, \dots \lambda_{p+q}$ be the eigen values of T. Then, total energy of G is $TE = \sum_{i=1}^{p+q} |\lambda_i|$. Further, here we write algorithms and MATLAB programs to find the total energy of some simple graphs.

Key Words: Total Energy, Path, Star, Y_{n+1}& Bull Graph.
AMS Subject Classification:05C50

I. Introduction:

Throughout this article we deal with finite, simple and undirected graphs. The concept of energy of a graph was proposed by Gutman [7] in 1978 as the sum of absolute values of the eigen value of a graph G and is denoted by $E(G)$. The eigen values of the total matrix T is known as the total eigen values of G. We find the total energy for Path, Star, Y_{n+1}& Bull Graph.

1.2 Definition Let $\lambda_1, \lambda_2, \lambda_3, \dots \lambda_{p+q}$ be the total eigen values of T. Then the spectrum of G is$Spec_T(G) = \begin{Bmatrix} \lambda_1 \lambda_2 \lambda_3 \dots \lambda_{p+q} \\ m_1 m_2 m_3 \dots m_{p+q} \end{Bmatrix}$ where m_i is the algebraic multiplicity of the total eigen values λ_i, for $1 \leq i \leq p + q$.

1.3 Definition The total graphT (G) of a graph G is a graph such that (i) the vertex set of T (G) corresponds to the vertices and edges of G and (ii) two vertices are adjacent in T (G) if and only if their corresponding elements are either adjacent or incident in G.

II. Total Matrix and Total Energy of a graph

2.1 Definition The total matrix $T = T(G)$ of G is a square matrix of order p+q whose (i,j)[th]entry is defined as:

12. Dr. K. Palani - Sign Pairity Difference Cordial Labeling of More Digraphs

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Sign Pairity Difference Cordial Labeling of More Digraphs

[1]K.Palani, [2]S.Nivetha & [3]A.Nagarajan
[1]palani@apcmcollege.ac.in
[2]M.Phil. Scholar, 20202013545102, nivethasubramanian8698@gmail.com
[3]nagarajan.voc@gmail.com, V.O.Chidambaram College, Thoothukudi-628008
[1,2]PG & Research Department of Mathematics
A.P.C.Mahalaxmi College for Women, Thoothukudi-628002, TN, India
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012, TN, India

ABSTRACT:
Let $D = (V, A)$ be a digraph. An injective function $f: V(D) \rightarrow \{1,2, \ldots .p\}$ is said to be a sign pairity difference cordial labeling if the induced arc labeling $f^*: A(D) \rightarrow \{0,1\}$ defined by $f^*((u,v)) = \begin{cases} 1 & if\ f(u) - f(v) > 0 \\ 0 & elsewhere \end{cases}$ satisfies the condition that $|e_f(0) - e_f(1)| \leq 1$ where, $e_f(0)$ is the number of arcs with label 0 and $e_f(1)$ is the number of arcs with label 1. In this paper, we analyze the existence of sign pairity difference cordial labeling in digraphs obtained from the underlined graphs Fan, Double Fan, Triangular Snake, Double Triangular Snake, Subdivided Star and Broken Comb.

Keywords: Sign Pairity Difference Cordial Labeling

AMS Subject Classification: 05C78

1 INTRODUCTION:

A directed graph or digraph D consists of a finite set V of vertices(points) and a collection of ordered pairs of distinct vertices. Any such pair (u, v) is called an arc or directed line and will usually be denoted by $\overrightarrow{uv}$. The arc $\overrightarrow{uv}$ goes from u to v and incident with u and v, we also say u is adjacent to v and v is adjacent from u. A digraph D with p vertices and q arcs is denoted by $D(p, q)$. The indegree $d^-(v)$ of a vertex v in a digraph D is the number of arcs having v as its terminal vertex. The outdegree $d^+(v)$ of v is the number of arcs having v as its initial vertex[5]. A labeling of a graph G is an assignment of integers to either the vertices or the edges or both subject to certain conditions. K.Palani et.al[8] introduced the sign pairity difference cordial labeling in digraphs. In this paper, we find the existence of sign pairity difference cordial labeling in digraphs obtained from the different underlined graphs.

1.1 Definition[8]: Let $D = (V, A)$ be a digraph. An injective function $f: V(D) \rightarrow \{1,2, \ldots .p\}$ is said to be a sign pairity difference cordial labeling if the induced arc labeling $f^*: A(D) \rightarrow \{0,1\}$ defined by $f^*((u,v)) = \begin{cases} 1 & if\ f(u) - f(v) > 0 \\ 0 & elsewhere \end{cases}$ satisfies the condition that $|e_f(0) - e_f(1)| \leq 1$ where, $e_f(0)$ is the number of arcs with label 0 and $e_f(1)$ is the number of arcs with label 1.

2 MAIN RESULTS:

2.1 Theorem: Let D_1 be the digraph obtained from Fan$(P_n + K_1)$ by orienting its edges as in Fig. 2.1. Then, D_1 admits sign pairity difference cordial labeling.

Proof: Let D_1 be the digraph as in Fig. 2.1

Let $V(D_1) = \{u_1, u_2, u_3 \ldots . u_n\}$

13. Dr.K.Palani & .N. Meenakumari - Radio Mean Labeling of some Inflated Graphs

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Radio Mean labeling of Some Inflated Graphs

[1]K. Palani, [2]S.S.Sabarina Subi & [3]N.Meenakumari
[1],[3] Associate Professor, palani@apcmcollege.ac.in
[2]Research Scholar,20112012092001
[1],[2] [3]PG & Research Department of Mathematics
A.P.C. Mahalaxmi College for Women, Thoothukudi-628002, TN, India
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012, TN, India.

Abstract:

Let G=(V,E) be a simple graph with p vertices and q edges.For a connected graph G of diameter d, a radio mean labeling is a one to one mapping f from V(G) to N satisfying the condition $d(u,v) + \left\lceil \frac{f(u)+f(v)}{2} \right\rceil \geq 1 + diam(G)$ for every $u, v \in V(G)$.The span of a labeling f is the maximum integer that f maps to a vertex of G. The radio mean number of G, $rmn(G)$ is the lowest span taken over all radio mean labelings of the graph G. In this paper, we analyze some inflated graphs for radio mean labeling.

Keywords: Radio Mean, Radio Mean Number, Radio Mean Labeling.
AMS Subject Classification: 05C78.

I.Introduction:

The graph labeling problem is one of the recent developing area in graph theory.Alex Rosa first introduced this problem in 1967[8]. Radio labeling is motivated by the channel assignment problem introduced by W. K. Hale in 1980[3].In 2001, Gary Chartrand defined the concept of radio labeling of G[1].Liu and Zhu first determined the radio number in 2005[4].Ponraj et al.[6] introduced the notion of radio mean labeling of graphs and investigated radio mean number of some graphs [7].

Radio Labeling is used for X-ray, crystallography, coding theory, network security, network addressing, channel assignment process, social network analysis such as connectivity, scalability, routing, computing ,cell biology etc.,

The following results are used in the subsequent section.

1.1 Definition: Let G=(V,E) be a simple graph with p vertices and q edges.For a connected graph G of diameter d, a radio mean labeling is a one to one mapping f from V(G) to N satisfying the condition $d(u,v) + \left\lceil \frac{f(u)+f(v)}{2} \right\rceil \geq 1 + diam(G)$ for every $u, v \in V(G)$.The span of a labeling f is the maximum integer that f maps to a vertex of G.The radio mean number of G, $rmn(G)$ is the lowest span taken over all radio meanlabelings of the graph G.In this paper, we analyze some inflated graphs for radio mean labeling.

1.2 Definition[2]: The **Inflation** of a graph G is obtained from G_I by replacing every vertex x of degree $d(x)$ by a clique $X = K_{d(x)}$ and each edge xy by an edge between two vertices of the corresponding cliques X and Y of G_I in such a way that the edges of G_I which come from the edges of G form a matching of G_I.

1.3Definition[5]: A **Y-tree** Y_{n+1} is a graph obtained from the path P_n by appending an edge to a vertex of the path P_n adjacent to an end point.

14. Dr. K. Palani & Dr. N. Meenakumari - Near Mean Labeling in Directed Double Cycles

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NEAR MEAN LABELING IN DIRECTED DOUBLE CYCLES

Palani K[1], Shunmugapriya A[2] & N.Meenakumari[3]
[1,3]PG & Research Department of Mathematics,
[2]Research scholar-19122012092005,
[1,2,3]A.P.C. Mahalaxmi College for Women, Thoothukudi-628 002.
[2]Department of Mathematics, Sri Sarada College for Women(Autonomous), Tirunelveli-627 011.
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli - 627 012, Tamil Nadu, India.
[1]palani@apcmcollege.ac.in, [2]priyaarichandran@gmail.com, [3]meenakumari.n123@gmail.com

Abstract:

Let $D(p,q)$ be a digraph. Let $f: V \rightarrow \{0,1,2,\dots,q\}$ be a 1-1 map. Define $f^{*}: A \rightarrow \{1,2,\dots,q\}$by $f^{*}(e=\overrightarrow{uv}) = \left\lceil \frac{f(u)+f(v)}{2} \right\rceil$. Let $f^{*}(v) = |\sum_{w\in V} f^{*}(\overrightarrow{vw}) - \sum_{w\in V} f^{*}(\overrightarrow{wv})|$. If $f^{*}(v) \leq 2 \ \forall v \in A(D)$, then f is said to be a near mean labeling of D and D is said to be a near mean digraph. In this paper, we define double cycles in digraphs and investigated the existence of near mean labeling in them.

Keywords: Near mean labeling, Digraphs, DirectedDouble cycles

AMS Subject Classification: 05C78.

1. Introduction:

A graph labeling is an assignment of integers to the vertices or edges or both subject to certain conditions. The concept of graph labeling was introduced by Rosa in 1967 [6]. A useful survey on graph labeling by J.A. Gallian (2014) can be found in [1]. Somasundaram and Ponraj [5] have introduced the notion of mean labeling of graphs. A directed graph or digraph D consists of a finite set V of vertices and a collection of ordered pairs of distinct vertices.Any such pair (u,v) is called an arc or directed line and will usually be denoted by $\overrightarrow{uv}$.The indegreed$^{-}(v)$ of a vertex v in a digraph D is the number of arcs having v as its terminal vertex. The outdegree $d^{+}(v)$ of v is the number of arcs having v as its initial vertex [2]. K. Palani et.al. introduced the concepts of mean and near mean digraphs in [4]. In this paper, the definition of Directed double cycles is introduced and the existence of near mean labeling is investigated.

The following definition and theorem are from [3] and [4].

1.1 Definition: Let C_m and C_n be two disjoint cycles with $u \in V(C_m)$and $v \in V(C_n)$. The double cycle $C(m,n)$is the graph obtained by identifying $u$and v.

1.2 Theorem: The directed cycle $\overrightarrow{C_n}$ is a near mean digraph.

2. Main Results:

2.1 Definition: In double cycle $C(m,n)$, orient the edges of each cycle clockwise, the resulting graph is called ***directed double cycle*** and it is denoted as $\overrightarrow{C(m,n)}$. Any $\overrightarrow{C(m,n)}$contains $m+n-1$ vertices and $m+n$ edges.

2.2 Theorem: Directed double cycle $\overrightarrow{C(m,n)}$ is a near mean digraph forall $m \geq 3$ and $n \geq 3$.

15. Dr. K. Palani & Dr. N. Meenakumari - Prime Pair Labeling of More Graphs

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Prime Pair Labeling of More Graphs

[1]K. Palani, [2]G. Suganya, [3]N.Meenakumari
[1,3]Associate Professor, [2]Research Scholar, Registration Number: 19112012092004
[1,2,3]PG & Research Department of Mathematics,
A.P.C Mahalaxmi College for Women, Thoothukudi, TN, India
Affiliated to Manonmaniam Sundaranar University, Tirunelveli, TN, India
[1]palani@apcmcollege.ac.in, [2]gsuganyaveni@gmail.com, [3]meenakumari.n123@gmail.com

Abstract:

Let $G = (V, E)$ be a (p, q)-graph. An injective function $f: V \to \{1,2,3, \ldots, p+q\}$ is said to be a prime pair labeling, if for every vertex $v \in V(G)$ with $d(v) > 1$, $gcd(f(x), f(y)) = 1 \; \forall \; x, y \in N(v)$. A graph which admits prime pair labeling is called a prime pair graph. In this paper, we survey the existence of prime pair labeling of various graphs.

Keywords: Labeling, Prime pair labeling, Graphs.

AMS Subject Classification: 05C78.

1.Introduction:

Graphs we consider here are simple, finite, connected and undirected. For basic definitions and notations in graph theory we follow Harary [1]. K. Palani et.al [5] introduced the concept of prime pair labeling of graphs. In this paper, we survey the existence of prime pair labeling of various graphs. The following facts are from [5].

1.1 Definition : Let $G = (V, E)$ be a (p, q)-graph. An injective function $f: V \to \{1,2,3, \ldots, p+q\}$ is said to be a prime pair labeling, if for every vertex $v \in V(G)$ with $d(v) > 1$, $gcd(f(x), f(y)) = 1 \; \forall \; x, y \in N(v)$. A graph which admits prime pair labeling is called a prime pair graph.

1.2 Theorem : The path P_n is prime pair.

1.3 Theorem : The comb graph $P_n \odot K_1$ is prime pair.

1.4 Theorem[2]: Bertrand-chebyshev theorem: $\pi(x) - \pi\left(\frac{x}{2}\right) \geq 1$, for all $x \geq 2$ where $\pi(x)$ is the prime counting function (number of primes less than or equal to x).

1.5 Definition [4]: The H-graph of a path P_n is the graph obtained from two copies of P_n with vertices $v_1, v_2, \ldots, v_n$ and $u_1, u_2, \ldots, u_n$ by joining the vertices $v_{\frac{n+1}{2}}$ and $u_{\frac{n+1}{2}}$ by an edge if n is odd and the vertices $v_{\frac{n}{2}+1}$ and $u_{\frac{n}{2}}$ if n is even. We denote this graph as HP_n.

1.6 Definition [3]: For graphs G and H, corona product $G \odot H$ is obtained by taking one copy of graph G and $|V(G)|$ copies of graph H and joining each vertex of i^{th} copy of graph H to the i^{th} vertex of the graph G, where $1 \leq i \leq |V(G)|$.

1.7 Definition [6]: A ladder graph L_n is defined by $L_n = P_n \times K_2$, the cartesian product of P_n and K_2.

2. Main Results:

2.1 Theorem: The HP_n, the H-graph of a path P_n is prime pair.

16. Dr. K. Palani & Dr. N. Meenakumari - Zumkeller Labeling of some Special Graphs

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Zumkeller Labeling of Some Special Graphs

[1]K. Palani, [2]P. Meenakshi ,[3]T. M. Velammal
[1]Associate Professor, [2]Assistant Professor, [3]PG Student
[1,2,3]PG & Research Department of Mathematics
A.P.C. Mahalaxmi College for Women, Thoothukudi-628002, TamilNadu, India
Affiliated to Manonmaniam Sundaranar University, Tirunelveli – 627012, Tamil Nadu, India.
[1]palani@apcmcollege.ac.in [2]meena.bushy@gmail.com, [3]avk.0912@gmail.com

Abstract :

Let $G = (V, E)$ be a graph. An injective function $f: V \to N$ is said to be a Zumkeller labeling of G, if the induced function $f^* : E \to N$ defined as $f^*(xy) = f(x)f(y)$ is a Zumkeller number for all $xy \epsilon E$, $x, y \epsilon V$. A graph $G = (V, E)$ that admits Zumkeller labeling is called a Zumkeller graph. In this paper we analyse the existence of Zumkeller labeling in splitting graphs.

Keywords: Graphs, Splitting graphs, Labeling, Zumkeller numbers

AMS Subject Classification: 05C78.

Introduction: The classes of labeled graphs can be identified through graph labeling, an interesting and potential research area of discrete mathematics. The collection of various graph labeling can be found in [1]. The graph labeled with Zumkeller numbers[2], a recent development in graph labeling, are potential area of research. In this paper, we analyse the existence of Zumkeller labeling [3]in splitting graphs [4]. The following results are useful for reference.

1.1 Definition: A positive integer n is said to be a Zumkeller number if all the positive factors of n can be partitioned into two disjoint parts so that the sum of the two parts is equal.

We shall call such partition as Zumkeller partition.

1.2 Properties of Zumkeller numbers:

(a) Let the prime factorization of an even Zumkeller number n be $2^k {p_1}^{k_1} {p_2}^{k_2} \dots {p_m}^{k_m}$. Then atleast one of k_i must be an odd number.

(b) Let p be a prime number of the form $p = 1 + 2^{r_1} + 2^{r_2} + 2^{r_3} + \cdots + 2^{r_l}$ where $r_1 < r_2 < r_3 < \cdots < r_l$ for some l. The positive integer $n = 2^\alpha p$ is a Zumkeller number if and only if $\alpha \geq r_l$

(c) If n is a Zumkeller number and p is a prime with $(n, p) = 1$, then np^l is a Zumkeller number for any positive integer l.

(d) For any prime $p \neq 2$ and a positive integer k with $p \leq 2^{k+1} - 1$, $2^k p$ is a Zumkeller number.

1.3 Definition: The splitting graph of the graph G is obtained by adding to each vertex v, a newvertex v' such that v' is adjacent to every vertex which is adjacent to v in G. In otherwords,

17. Dr. D. Radha - A Study on β5 Near Ring

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 229

A STUDY ON β_5 NEAR RING

D.Radha[1], V.Ananthi[2]
[1]Assistant Professor, PG and Research Department of Mathematics,
A.P.C.Mahalaxmi College for Women, Thoothukudi.
[2]I M.SC (Mathematics)
Fatima College, Madurai.

ABSTRACT
In this paper we have introduced the concept of β_5 near ring. Also some basic structures with respect to commutativity is established. Every weak commutative near rings is satisfying the property of β_5 near rings. Homomorphism preserves the property of β_5 in near rings. The quotient ring N/I is also a β_5 near ring whenever N is a β_5 near ring where I is any ideal of N. The property of mate function is true in a β_5 near ring if and only if whenever $x \in x^2 N$. Also, it is proved that, a zero symmetric β_5 near ring with mate function have (*, IFP) and the set of all idempotents is always contained in its centre.

KEYWORDS
IFP near ring, Mate function, Near ring, Weak commutativity,Zero-symmetric near ring.

1.INTRODUCTION:

Near rings can be thought of as generalized rings: if in a ring we ignore the commutativity of addition and one distributive law, we get a near ring. Taussky [15] in 1936 and B. H. Neumann [4] in 1940 considered near rings in which addition need not be commutative. Since then the theory of near rings has been developed much. Later Frolich [1], Beidleman [11], Oswald [2] and many other researchers had done and have been doing extensive work on different aspects of near rings. Gunter Pilz [10] "Near rings" is an extensive collection of the work done in the area of near rings. In this paper we defined the concept of β_5 near ring.

2.PRELIMINARIES

Definition 2.1 A *right near ring* (N,+, .) is a non-empty set together with two binary operations '+' and '.' such that

i) (N,+) is a group (not necessarily abelian).
ii) (N, .) is a semi group.
iii) For any x,y and z in N, $(x+y)z = xz + yz$.

Definition 2.2 $N_0 = \{n \in N \,/\, n0 = 0\}$ is called the *zero-symmetric part* of N and N is called *zero symmetric* if $N = N_0$.

Definition 2.3 N is said to be *weak commutative* if $xyz = xzy$ for every x,y and $z \in N$.

Definition 2.4 Let N, N' be two near rings. Then $h : N \rightarrow N'$ is called a *near ring homomorphism* if for every m and $n \in N$,

i) $h(m+n) = h(m) + h(n)$.
ii) $h(mn) = h(m)\, h(n)$.

18. Dr. D. Radha - On Some Characterizations of R-Near Rings

Proceedings, Second International Conference on Applied Mathematics and Intellectual Property Rights, A.P.C.Mahalaxmi College for Women, Thoothukudi, 09 &10 March 2021 235

On Some Characterizations of R-Near Rings

Radha. D[1], Dhivya. C[2]
[2]Research Scholar
[1,2]PG and Research Department of Mathematics
A.P.C.Mahalaxmi College for Women, Thoothukudi.
Affiliated to Manonmaniam Sundaranar University,Abishekapatti,
Tirunelveli-627012, Tamil Nadu, India

ABSTRACT

In this paper we have discussed some more results on R-Near Ring. We have proved some properties of R-Near ring using the concept ofidempotency, strong IFP and so on. A structure theorem for R-Near ring has been proved. That is any homomorphic image ofR-Near Ring is also a R-Near Ring. The characterization of α_2 near ring in terms of R-Near ring and Boolean near rings has been discussed. We have also proved every R-Near Ring is zero symmetric. If N is reduced R-Near ring then N is commutative.

Keywords: Boolean, Commutative, P_1 near ring, Regular, Simple, Zero divisors.

1.Introduction

Near rings can be thought of as generalized rings: if in a ring we ignore the commutativity of addition and one distributive law, we get a near ring. Gunter Pilz "Near Rings" is an extensive collection of the work done in the area of near rings.

Throughout this paper N stands for a right near ring $(N,+,\cdot)$, with at least two elements and '0' denotes the identity element of the group $(N,+)$ and we write xy for $x.y$ for any two elements x,y of N. Obviously $0n = 0$ for all $n \in N$. If, in addition, $n0 = 0$ for all $n \in N$ then we say that N is zero symmetric. For any subset A of N, we denote A^* the set of all non zero elements of A. In particular $N^* = N - \{0\}$.

2.Preliminaries

Definition 2.1 [17] Let N be a right near ring. If for every a in $N - \{0\}$ there exists x in $N - \{0\}$ such that $x = xax$ then we say N is an α_2 **near ring**.

Definition 2.2 [5] An element $0 \neq x \in N$ is called a **right zero divisor** if there exists $0 \neq a \in N$ such that $ax = 0$.

Definition 2.3 [5] An element $0 \neq x \in N$ is called a **left zero divisor** if there exists $0 \neq a \in N$ such that $xa = 0$.

Definition 2.4 [5] A **zero divisor** is an element that is either a left (or) right zero divisor.

Notation 2.5 [1] E denotes the set of all idempotents of $N (a \in E \text{ iff} a^2 = a)$.

Definition 2.6 [3] N is said to fulfill the **Insertion of Factors Property (IFP)** provided that for all a,b,n in N, $ab = 0 \Longrightarrow anb = 0$.

19. Dr. D. Radha - A Study on the Sub-Structure of a Seminear Ring

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A Study on the Sub-Structure of a Seminear Ring

[1]D. Radha, [2]M. Kalaiselvi, [3]K. Muthu Maheswari
[1]Assistant Professor, A.P.C. Mahalaxmi College for Women, Thoothukudi.
[2]Assistant Professor, Govindammal Aditanar College for Women, Tiruchendur.
[3]Thoothukudi.

Abstract: In this paper we introduce the concept of stable and pseudo stable seminear rings. Motivation for this concept actually stems from stable and pseudo stable near rings. It is quite natural for us to extend the concepts of stable and pseudo stable near rings to seminear rings. The properties of stable and pseudo stable seminear rings are discussed using the concepts of idempotent, Insertion of Factors Property (IFP), mate function and so on. We also show that R is a stable seminear ring if and only if $E \subseteq C(R)$ and any homomorphic image of a stable seminear ring is a stable seminear ring. We show that any pseudo stable seminear ring R has $(*, IFP)$ also. We also obtain some structure theorems for such seminear rings.

Keywords: Seminear rings, Stable and pseudo stable near rings, Mate function, Mutual mate function, Insertion of factors property.

1. Introduction

Willy. G. Van Hoorn and B. Van Rootselaar [11] introduced the notion of a seminearring which is a generalization of a semiring and nearring. S. Suryanarayanan and N. Ganesan [10] worked in the field of mate function in nearrings. G. Manikandan [1] and R. Perumal [1] worked in the field of mate function in seminearrings and obtained many more properties of mate functions. In [10] S. Suryanarayanan and N. Ganesan have defined N to be stable if $xN = xNx = Nx$ for every x in N and pseudo stable if $aN = bN \Longrightarrow Na = Nb$ for all a, b in N. Motivated by this, we introduce the concept of stable and pseudo stable seminear rings. In this paper, we discuss the properties of stable and pseudo stable seminear rings. In a semiring $(N, +, .)$ if we ignore commutativity of addition and one distributive law, $(N, +, .)$ is a seminearring. Throughout this paper, by a seminear ring we mean a right seminear ring with an absorbing zero.

2. Preliminaries

Definition 2.1 A **seminear ring** is a non-empty set R with two binary operations $+$ and $.$ such that

(i) $(R, +)$ is a semigroup
(ii) $(R, .)$ is a semigroup
(iii) $(x + y)a = xa + ya$ for all $a, x, y \in R$.

Definition 2.2 A seminear ring R is said to have an **absorbing zero** if
(i) $a + 0 = 0 + a = a$
(ii) $a.0 = 0.a = 0$, holds for all $a \in R$.

20. Dr. R. Rajeswari & Dr. N. Meenakumari - K – Domination of Zero – Divisor Graphs

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k-Domination of Zero-Divisor Graphs

[1]R. Rajeswari, [3]S.Ragha, [2]N.Meenakumari, [4]K. Aruna Sakthi
[1]Assistant Professor, [2]Associate Professor,
[3]Research Scholar, Registration Number: 20212012092008
[4]Research Scholar, Registration Number: 20212012092006
PG & Research Department of Mathematics
A.P.C Mahalaxmi College for women, Thoothukudi
[1]rajimuthuram@gmail.com, [3]raghasankar810@gmail.com,
[2]meenakumari.n123@gmail.com, [4]arunasakthi9397@gmail.com

Abstract

The concept of k −domination in graphs was introduced by Fink and Jacobson. A k-dominating set is a set of vertices D such that each vertex in $V(G) - D$ is dominated by at least k vertices in D for a fixed positive integer k. The minimum cardinality of a k-dominating set is called k-domination number $\gamma_k(G)$. In this paper, we commence the study on k −domination of zero-divisor graphs and discussed some theorems of all these structures in detail.

Keywords: k −domination, zero-divisor graph

1. Introduction

The Mathematical study of Domination theory in graphs started around 1966. C.Berge wrote a book on graph theory in which he defined the concept of the domination number in1958. The notation (G) was first used by E.J. Cockayne and S.T. Hedetniemi for the domination number of a graph whichsubsequently became the accepted notation. The idea of a zero divisor graph was introduced by I. Beck in 1988. In a later variant studied by Anderson & Livingston in 1999,that the vertices represent only the zero divisors of the given ring and it is denoted by $\Gamma(R)$.A zero-divisor graph is an undirected graph representing the zero-divisors of a commutative ring R. In this paper, we introduced k −domination of zero-divisor graphs and investigate some theorems extensively.

2. Preliminaries

Definition: 2.1 [4] A *dominating set* for a graph $G = (V, E)$ is a subset D of V such that every vertex not in D is adjacent to atleast one member of D. The domination number $\gamma(G)$ is the number of vertices in a smallest dominating set for G.

Definition: 2.2 [4] Given a ring R, let $\mathbb{Z}^*(R)$ denote the set of *zero-divisors* of R. Let $\Gamma(R)$ denote the zero-divisor graph whose vertex set is $\mathbb{Z}^*(R)$, such that distinct vertices r and s are adjacent provided that $rs = 0$.

Definition: 2.3 [5] A *k-dominating set* is a set of vertices D such that each vertex in $V(G) - D$ is dominated by at least k vertices in D for a fixed positive integer k. The minimum cardinality of a k-dominating set is called k-domination number $\gamma_k(G)$.

21. Dr. R. Rajeswari & Dr. N. Meenakumari - On Intuitionistic Fuzzy Weak Bi-Ideals Of Boolean Like Semi Rings

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ON INTUITIONISTIC FUZZY WEAK BI-IDEALS OF BOOLEAN LIKE SEMI RINGS

[1]R.Rajeswari, [2]M.Karpagam, [3]A.Sundari, [4]N.Meenakumari
[1]Assistant Professor, [4]Associate Professor,
[2,3]PG Student,
[1,2,3,4] PG & Research Department of Mathematics,
A.P.C. Mahalaxmi College for Women, Thoothukudi – 628002, TN, India
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli 627012, TN, India
[1]rajimuthuram@gmail.com, [4]meenakumari.n123@gmail.com,
[2]mkarpagam08091998@gmail.com, [3]sundariprema1999@gmail.com

Abstract

The concept of fuzzy set was introduced by Zadeh. R.Rajeswari, M.Aruna and N.Meenakumari have introduced the notion of Intuitionistic Fuzzy bi-ideals in Boolean like semi rings. In this paper, we extend this notion into Intuitionistic Fuzzy Weak bi-ideals in Boolean like semi rings. We discuss the results of all these newly structures in detail. We also obtain some characterisations and complete theorems for Boolean like semi rings.

Keywords: Intuitionistic fuzzy set, Intuitionistic fuzzy bi-ideal, Intuitionistic fuzzy weak bi-ideal, Boolean like semi ring.

1. INTRODUCTION

The notation of fuzzy sets and fuzzy logic was introduced by Lotfi A. Zadeh in 1965. Fuzziness occurs when the knowledge is not precise. A fuzzy set can be defined by assigning to each individual of the universe under consideration, a value of membership. Fuzzy theory is associated with information theory and uncertainty. Fuzzy ideals of rings were introduced by Liu, and it has been studied by several authors. Boolean like semi rings were introduced in roll by K. Venkatesawarla, B.V.N. Murthy and N. Amaranth during 2011. A Boolean like ring is a commutative ring with unity and is of characteristic 2. The idea of "Intuitionistic Fuzzy Set" (IFS) was first introduced by Atanassov as a generalization of the notion of fuzzy set. In the sense of Atanassov an IFS is characterized by a pair of functions valued in [0,1] : the membership function and the non-membership function. The notion of Fuzzy Bi-Ideals of rings were introduced by Manikandan and it has been studied by several authors. R. Rajeswari and N. Meenakumari were extend the concept of Anti fuzzy Bi-ideals in Boolean like semi-rings. In this paper we introduce the concept of "On Intuitionistic Fuzzy Weak Bi Ideals in Boolean like semi ring"

2. PRELIMINARIES

Definition : 2.1 A non-empty set R with two binary operations '+' and '.' is called a near ring if

i. $(R, +)$ is a group
ii. $(R, .)$ is a semigroup
iii. $x.(y + z) = x.y + x.z$, for all $x, y, z \in R$

22. Dr. R. Rajeswari & Dr. N. Meenakumari - Square Sum Labeling of Zero-Divisor Graphs

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Square Sum Labeling of Zero-Divisor Graphs

[1]R. Rajeswari, [2] K. Aruna Sakthi, [3]N. Meenakumari, [4]S. Ragha
[1] Assistant Professor, [3]Associate Professor
[2] Research Scholar, Reg: No:20212012092006
[4]Research Scholar, Reg No: 20212012092008
[1,2,3,4]PG & Research Department of Mathematics,
A.P.C. Mahalaxmi College for women, Thoothukudi.
Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012,
Tamilnadu, India.
[1]rajimuthuram@gmail.com, [2]arunasakthi9397@gmail.com, , [3]meenakumari.n123@gmail.com,
[4]raghasankar810@gmail.com

ABSTRACT

Let $G = (V, E)$ be a graph with p vertices and q edges. A graph has square sum labeling if there exist a bijective function $f: V(G) \to \{0,1,2,\ldots,p-1\}$ such that the induced function $f^*: E(G) \to N$ defined by $f^*(uv) = (f(u))^2 + (f(v))^2$ for every $uv \in E(G)$ is injective. The graph G is called square sum graph if graph G admits square sum labeling. In this paper we investigate how square sum labeling works on certain zero-divisor graphs.

Keywords: Zero-divisor graphs, Square Sum Labeling.
AMS Subject Classification: 05C78, 05C25

1. INTRODUCTION

Graph labeling was introduced by Alexander Rosa in the year 1967[4]. Rosa identified three types of labeling which was later renamed by Solomon Golomb. In the field of Engineering and technology labelled graphs has its own application. Sum of squares of numbers from number theory which motivated the authors to study the particular graphs named square sum graphs. Acharya and Germina defined a square sum labeling of a (p,q)graph G [1] [5]. This type of labeling is closely related to Dio-phantine equation. There are two variations of the zero-divisor graph. One is in the Beck definition in the year 1988, in which the vertices represent all elements of the ring [3]. In the year 1999, Anderson and Livingston slightly varied the graph, in which the vertices represent only the zero-divisor of the given ring [2].

2. PRELIMINARIES

Definition: 2.1 Let R be a commutative ring with identity 1 and let $Z(R)$ be its set of zero-divisors. We associate a $\Gamma(R)$ to R with vertices$Z^* = Z(R) - \{0\}$, the set of nonzero zero-divisor of R, and for distinct $x, y \in Z(R)^*$, the vertices x and y are adjacent if and only if $xy = 0$. We denote their zero-divisor graph of R by $\Gamma_0(R)$ if we take vertex set as $Z(R)$. In $\Gamma_0(R)$, the vertex 0 is adjacent to every other vertex. $\Gamma(R)$ is a induced subgraph of $\Gamma_0(R)$

Definition: 2.2A graph has square sum labeling if there exist a bijective function$f: V(G) \to \{0,1,2,\ldots,p-1\}$ such that the induced function $f^*: E(G) \to N$ defined by $f^*(uv) = (f(u))^2 + (f(v))^2$ for every $uv \in E(G)$ is injective. A graph is said to be square sum graphs if it has square sum labeling. The graph G is called square sum graph if graph G admits square sum labeling.

23. Dr. S.V. Vani - A New Approach to Soft Generalized Open Sets

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A NEW APPROACH TO SOFT GENERALIZED OPEN SETS

[1]S.V.Vani, [2]K.Bala Deepa Arasi, [3]V.Maheswari
[1]Research Scholar, Reg No : 19112012092003(Full-Time),
[2,3]Assistant Professor of Mathematics,
[1,2,3]PG& Research Department of Mathematics,
A.P.C.Mahalaxmi College for Women, Thoothukudi, TN, India.
Affiliated to ManonmaniamSundaranar University, Tirunelveli, TN, India.
[1]vanikathir16@gmail.com, [2]baladeepa@apcmcollege.ac.in, [3]mahiraj2005@gmail.com

ABSTRACT:

In this present paper we have introduced the new approach to soft sets called soft $\mathcal{M}$-Neighborhoods and soft $\mathcal{M}$ -Tangency points and investigated some of their properties. This new class of soft sets contributes to widening the scope of soft topological spaces and its applications.

Key words: Soft sets, Soft topology, Soft $\mathcal{M}$-open sets, soft $\mathcal{M}$-interior, soft $\mathcal{M}$-Neighborhoods, soft $\mathcal{M}$-Tangency points

AMS Subject Classification(2010): 54A10, 54C08

I.INTRODUCTION

Any Research work should result in addition to the existing knowledge of a particular concept. Such an effort not only widens the scope of the concept but also encourages others to explore new and newer ideas. The researchers have already introduced a new class of soft sets called Soft $\mathcal{M}$-open and Soft $\mathcal{M}$- Closed[5] sets in Soft Topological Spaces.

In 1999 Molodtsov[3] initiated the theory of soft sets as a new mathematical tool for dealing uncertainty, which is completely a new approach for modeling vagueness and uncertainties. Soft Set Theory has a rich potential for application in solving practical problems in Economics, Social Sciences, Medical Sciences etc. Applications of Soft Set Theory in other disciplines and in real life problems are now catching momentum. Molodtsov successfully applied Soft Theory into several directions, such as Smoothness of Functions, Game theory, Operations Research, Riemann Integration, Perron Integration, Theory of Probability, Theory of Measurement and so on. In 2011, Shabir and Naz[4] introduce the notion of soft topological spaces which are defined over an initial universe with a fixed set of parameters. In 2011 Hussain and Ahamed[2] introduced the notion of soft neighborhood of a point. In thispaper a newapproach tosoft sets called $\mathcal{M}$-Neighborhoods and soft $\mathcal{M}$-Tangency points are introduced and few of their properties are investigated.

II.RESULTS USED IN THIS STUDY

In this section, we present the basic definitions and results of soft set theory which will be needed in the sequel.

Definition :1 Let $\mathcal{U}$ be initial universe and $\mathcal{P}$ be a set of parameters. Let $\mathfrak{P}(\mathcal{U})$ denote the power set of $\mathcal{U}$ and $\mathcal{E}$ be a non empty subset of $\mathcal{P}$. A pair $(\alpha, \mathcal{P})$ denoted by $\alpha_{\mathcal{P}}$ is called a soft set over $\mathcal{U}$, where α is a mapping given by $\alpha : \mathcal{E} \longrightarrow \mathfrak{P}(\mathcal{U})$.

Definition :2 Let τ be the collection of soft sets over a universe $\mathcal{U}$ with a fixed parameters $\mathcal{P}$, then $\tau \subseteq SS(\mathcal{U})_{\mathcal{P}}$ is called a soft topology on $\mathcal{U}$ if:

3rd International Conference on Matrials and Technology Synthesis, Proceedings and Applications

24. Dr. P. Yokeswari Nithya - Green Synthesis of Metal Oxide nanoparticles from the Whole Plant extract of Catharanthus Pusillus(murr.) G.Don(apocynaceae) and their enhanced antioxidant activity

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Green synthesis of metal oxide nanoparticles from the whole plant extract of *Catharanthus pusillus*(murr.) G.Don(apocynaceae) and their enhanced antioxidant activity

Yokeswari Nithya*, P Gurulakshmi P, Gnana Vasuki M

Department of Chemistry, A.P.C Mahalaxmi College for Women, Thoothukudi – 628 002, Tamil Nadu, India

*Corresponding Author: yokeswarinithya@gmail.com

Abstract: Plants are known to possess therapeutic compounds which are being exploited since ancient times as a traditional medicine. Due to huge diversity plants have been explored constantly for wide range of applications in the field of pharmaceutical, agricultural, industrial etc. The scope of the project is synthesis and characterize the Copper nanoparticles from the whole plant extract of Catharanthus pusillus (Apocynaceae). The synthesized nanoparticles were characterized by using PL, XRD, SEM, UV and IR spectrum. Antioxidant study of synthesized nanoparticles were also carried out.

Keywords: Catharanthus pusillus, SEM, EDAX, XRD & PL

INTRODUCTION

Globally, about 85% of the traditional medicines used by different ethnic groups inhabiting various terrains for primary healthcare are derived from plants, especially in India; medicinal plants are widely used by all sections of the population with an estimated 7500 species of plants used by several ethnic communities (Farnsworth et al., 1988). India is the largest producer of medicinal herbs and appropriately called the Botanical garden of the world (Ahmedulla et al., 1999).

Synthesis of metal nanoparticles using plant extracts is very cost effective, and therefore can be used as an economic and valuable alternative for the large-scale production of metal nanoparticles. Extracts from plants may act both as reducing and capping agents in nanoparticle synthesis. The bioreduction of metal nanoparticles by combinations of biomolecules found in plant extracts is environmentally benign, yet chemically complex. Because of the important and critical roles of plants in bio-based protocols for metal nanoparticle production, the green synthesis of metal nanoparticles using plants has been discussed in this review. *Catharanthus pusillus* belonging to family Apocynaceae is known with various names in India and all over the world. The present study focuses to

- Synthesis Copper nanoparticles from whole plant of *Catharanthus pusillus*
- Characterise the synthesized nanoparticles by using XRD, SEM
- To evaluate the antioxidant study of synthesized nanoparticles

25.Dr. V. Maheswari -Gd-distance of Corona Product of Graphs

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Gd-distance of Corona Product of Graphs

K.Thanga kanniga[1], V.Maheswari[2],

[1]Registration Number: 19122012092012, Research Scholar, PG and Research Department of Mathematics, A.P.C.Mahalaxmi College for Women, Thoothukudi-628002, Tamilnadu, India. (Affiliated to Manonmaniam Sundaranar University, Tirunelveli-627012, Tamilnadu, India)
[2]Assistant Professor, PG and Research Department of Mathematics, A.P.C.Mahalaxmi College for Women, Thoothukudi-628002, Tamilnadu, India.
Email: kannigaprasathkpk@gmail.com, mahiraj2005@gmail.com

Abstract:

In this paper, we have determined the Gd-distance of the corona product of two graphs. Using the results obtained, the exact Gd-distance of certain classes of graphs are computed.

Keywords: Gd-distance; Wiener index; Corona product; Path; Cycle; Complete Graph;

Subject Classification: 05C12, 05C76.

1.Introduction

We assume that all graphs considered in this paper are simple and connected.

Let G = (V(G),E(G)) be a connected graph of order n. For any x,y ∈V(G), the distance between x and y in G, denoted by $d_G(x,y)$ or by d(x,y) , is the length of the shortest (x,y)-path in G. The degree of a vertex x∈V(G) is denoted by $d_G(x)$. Let P_n,C_n and S_n denote the path, the cycle and the star on n vertices, correspondingly. The number of edges of G is indicated by Ɛ(G). V.Maheswari et.al introduced the idea of Gd-distance between any two vertices in graphs and also the Gd-distance of a graph [9,10]. In this paper, we obtain the Gd-distance of the corona product of graphs.

1.1 Definition: The Wiener index W(G) is the first distance-based topological index defined as W(G) = $\sum_{\{x,y\}\subseteq V(G)} d_G(x,y) = \frac{1}{2}\sum_{x,y\in V(G)} d_G(x,y)$.

1.2 Definition: For a connected graph G, the Dd-length of a connected x-y path is defined as $D^{Dd}(x,y) = D(x,y) + degx + degy$.

1.3 Definition[9]: The Gd-distance of a x-y path is defined as

$d^{Gd}(x,y) \;= d(x,y) + degx + degy.$

1.4 Definition[10]: The Gd-distance of G, denoted by $d^{Gd}(G)$ is defined as

$d^{Gd}(G) = \sum_{\{x,y\}\subseteq V(G)}[d(x,y) + degx + degy]$.

1.5 Definition[6]: The corona product G⊙H of two graphs G and H is obtained by taking one copy of G and $|V(G)|$ disjoint copies of H; and then joining the i^{th} vertex of G to every vertex in i^{th} copy of H, where 1≤ i≤ $|V(G)|$.

1.6 Lemma[11]:

(i) The wiener index of a path graph P_n, where n ≥ 2 is, W(P_n) = $\frac{1}{6}n(n^2-1)$.