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PG & RESEARCH DEPARTMENT OF MATHEMATICS

MACMAS~'23

NATIONAL CONFERENCE ON "ADVANCES IN GRAPH THEORY"

CERTIFICATE

This is to certify that ~~Mr/Ms~~/Dr. K.CHINJU KRISHNA , ASSISTANT PROFESSOR, MUSLIM ARTS COLLEGE , THIRUVITHANCODE has participated/presented a paper entitled STAR RELATED EVEN SUM GRAPHS in the National Conference on "ADVANCES IN GRAPH THORY" organized by PG & Research Department of Mathematics, Malankara Catholic College in association with Kerala Mathematical Association held on 3rd March 2023.

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CONTENTS

Proceedings of the National Conference on Advances in Graph Theory
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STAR RELATED EVEN SUM GRAPHS

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Abstract

A sum graph is a graph for which there is a labeling of its vertices with distinct positive integers so that two vertices are adjacent if and only if the sum of their labels is the label of another vertex. Integral sum graphs are defined similarly, except that the labels may be any integers. The concept of Even Sum Graphs was introduced by Chinju Krishna K, et al. A graph G is called an even sum graph if there is a labelling η of its vertices with distinct non - negative even integers, so that for any two distinct vertices a and b; ab is an edge of G if and only if $\eta(a) + \eta(b) = \eta(c)$ for some vertex w in G. The minimum number of isolated vertices required to make the graph G, an even sum graph is called the even sum number of G and is denoted by $\gamma(G)$.

Keywords : even sum graph, even sum number, star, bistar, cycle.

Subject Classification : 05C05, 05C70, 05C75, 05C78

1. Introduction

The concept of Sum Graphs and Integral Sum Graphs was introduced by F. Harary [14]. The properties of Sum Graphs are investigated by many authors, including Chen. Z [1], Mary Florida. L [17], Nicholas. T [15, 16], Soma Sundaram. S [15], Vilfred.V [16 - 20], Surya Kala.V [18, 19] and Rubin Mary. K [19, 20]. Insired by the concepts of Sum Graphs and Integral Sum Graphs, Chinju Krishna. K, et al. introduced Even Sum Graphs. In this paper we investigated different types of Star Related Even Sum Graphs [2 - 11]. For all basic ideas, we refer [12, 13].

Bistar $B_{n,n}$ is the graph obtained by joining the center (apex) vertex of two copies of $K_{1,n}$. A graph $< C_n, K_{1,m}>$ where $m \geq 1$ is obtained by attaching the central vertex of a star graph $K_{1,m}$ to a vertex of a cycle C_n.

2. Main Results

Theorem: 3.1. $B_{n,n}$ is an even sum graph.

Proof: Let $a_{ij}, 1 \leq i \leq 2, 1 \leq j \leq n$ be the vertices of two copies of $K_{1,n}$ with the central vertices b_i, $1 \leq i \leq 2$. Join the central vertices by an edge. The resultant graph is $B_{n,n}$. Define a function η: $V(B_{n,n}) \rightarrow 2Z^* \cup \{0\}$ by $\eta(b_1) = 2$; $\eta(a_{1,1}) = 4$; $\eta(a_{1,j}) = \eta(a_{1,(j-1)}) + \eta(b_1)$, $2 \leq j \leq n$; $\eta(b_2) = 0$;

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$\eta(a_{2,1}) = \eta(a_{1n}) + \eta(b_2)$; $\eta(a_{2,j}) = \eta(a_{2,(j-1)}) + 2$, $2 \le j \le n$. Then the labels are distinct and for any edge ab in $B_{n,n}$, the condition $\eta(a) + \eta(b) = \eta(c)$ holds for some vertex c in G. Hence $B_{n,n}$ is an even sum graph.

Example: 3.2. An even sum graph of $B_{6,6}$ is shown in the Figure 3.1.

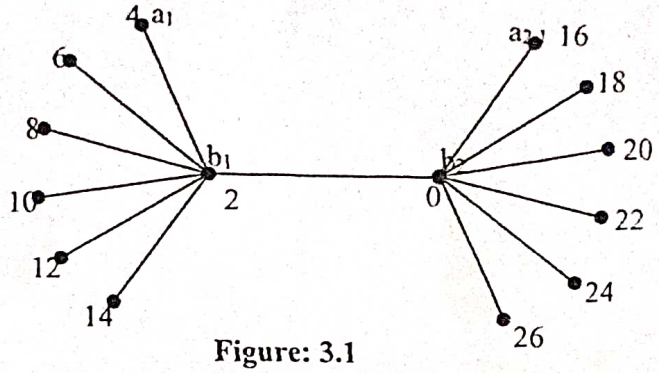

Figure: 3.1

Theorem: 3.3. $< C_n, K_{1,m} >$ is an even sum graph.

Proof: Let $a_1a_2 \ldots a_na_1$ be the cycle C_n and let $b_1, b_2, \ldots, b_m$, c be the vertices of $K_{1,m}$ where c is the central vertex. Identify a_1 with c. The resultant graph is $< C_n, K_{1,m} >$. Define a function η: $V(< C_n, K_{1,m} >) \rightarrow 2Z^+ \cup \{0\}$ by $\eta(a_1) = 0$; $\eta(a_2) = 2$; $\eta(a_2) = 4$; $\eta(a_i) = \eta(a_{i-2}) + \eta(a_{i-1})$, $4 \le i \le n$; $\eta(b_1) = \eta(a_{n-1}) + \eta(a_n)$; $\eta(b_i) = \eta(b_{i-2}) + 2$, $2 \le i \le m$. Then the labels are distinct and for any edge ab in $< C_n, K_{1,m} >$, the condition $\eta(a) + \eta(b) = \eta(c)$ holds for some vertex c in G. Hence $< C_n, K_{1,m} >$ is an even sum graph.

Example: 3.4. An even sum graph of $< C_6, K_{1,5} >$ is shown in the Figure 3.2.

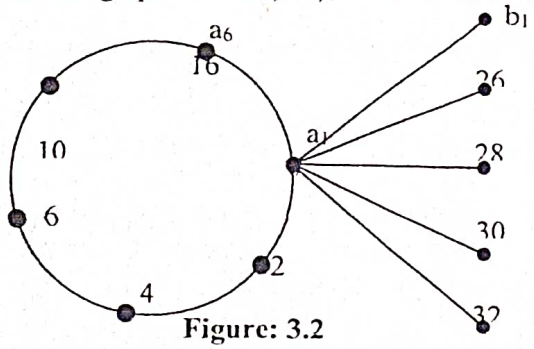

Figure: 3.2

3. Conclusion

In this paper, we have explored the concept of even sum graphs and we investigated different types of star related even sum graphs. This paper motivates to derive similar results on other types of graphs to be an even sum graph and to investigate the characterization of even sum graphs.

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