SQUARES OF SQUARE DIFFERENCE LABELING ON PATH RELATED GRAPH

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Abstract

Let $G(V,E)$ be a graph with p vertices and q edges. Let $f:V(G)\to\{0,1,2,\dots,p-1\}$ be a bijection. Define $f^*:E(G)\to N$ by $f^*_{ssd}(uv)=\left[\left(f(u)\right)^2-\left(f(v)\right)^2\right]^2, \forall uv\in E(G)$. If f^*_{ssd} is injective then f^*_{ssd} is called squares of square difference labeling of G. A graph G which admits squares of square difference labeling is called squares of square difference graph. We applied squares of square difference labeling to Path related graphs

1. Introduction

Every graph in this paper are simple finite, undirected and non-trivial graph $G=(V,E)$ with vertex set V and Edge set E. For graph theoretic terminology we refer to Harary. The square sum labeling is defined by V. Ajitha, S. Arumugam and K. A. Germina.

We have improved to the square of square difference and we investigated it for path related graph

2. Definition

Definition 2.1

A Path P_n in a graph is a sequence of edges, each one incident to the next.

Definition 2.2

A Path P^2_n is a graph is obtained by appending v_i v_{i+1} and v_j and v_{j+2} for $1\le i\le n-1$ and $1\le j\le n-2$

3. Theorems

Theorem3.1 The Path graph P_n is a squares of square difference graph.

Proof

Let $V=\{v_i/1\le i\le n\}$ be the vertex set of P_n graph.

Let $E=\{v_iv_{i+1}/1\le i\le n-1\}$ be the edge set of P_n graph.

Here $|V(G)|=n$ and $|E(G)|=n-1$.

Define $f:V\to\{0,1,2,\dots,p-1\}$ by

$f(v_i)=i-1; 1\le i\le n$

Clearly f is a bijection.

Then the corresponding edge label are as follows

$f^*_{ssd}(v_iv_{i+1}) = [[f(v_i)]^2 - [f(v_{i+1})]^2]^2 = [i^2 - 2i + 1 - i^2]^2$

$= [-2i + 1]^2 = 4i^2 + 1 - 4i; \forall 1 \leq i \leq n - 1.$

Clearly the edge labels are distinct.

P_n is a square of square difference graph.

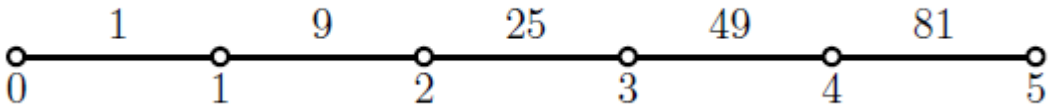

Figure 3.1

Theorem3.2 The Path graph P^2_n is a squares of square difference graph.

Proof

Let $V = \{v_i/1 \leq i \leq n\}$ be the vertex set of P^2_n graph.

Let $E = \{v_iv_{i+1}/1 \leq i \leq n - 1\} \cup \{v_iv_{i+2}/1 \leq i \leq n - 2\}$ be the edge set of P^2_n graph.

Here $|V(G)| = n$ and $|E(G)| = 2n - 3$.

Define $f: V \to \{0, 1, 2, \dots, p - 1\}$ by

$f(v_i) = i - 1; 1 \leq i \leq n$

Clearly f is a bijection.

Then the corresponding edge label are as follows

$f^*_{ssd}(v_iv_{i+1}) = [[f(v_i)]^2 - [f(v_{i+1})]^2]^2 = [i^2 - 2i + 1 - i^2]^2$

$= [-2i + 1]^2 = 4i^2 + 1 - 4i; \forall 1 \leq i \leq n - 1.$

$f^*_{ssd}(v_iv_{i+2}) = [[f(v_i)]^2 - [f(v_{i+2})]^2]^2 = [i^2 - 2i + 1 - (i^2 + 2i + 1)]^2$

$= [-4i]^2 = 16i^2; \forall 1 \leq i \leq n - 1.$

Clearly the edge labels are distinct.

P^2_n is a square of square difference graph.

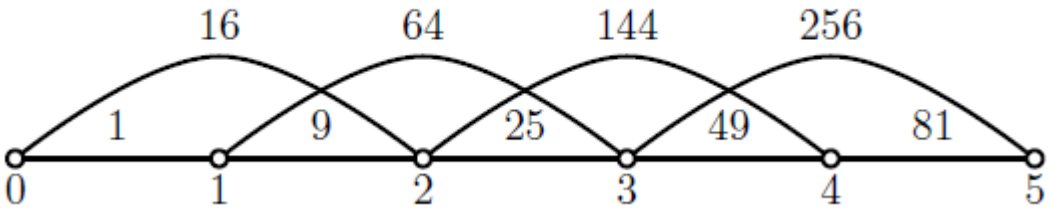

Figure 3.2

4 Conclusions

In this paper, we proved Path P_n graphs and P^2_n graphs are squares of square difference graphs. There may be interesting squares of square difference graphs can be constructed in future.

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