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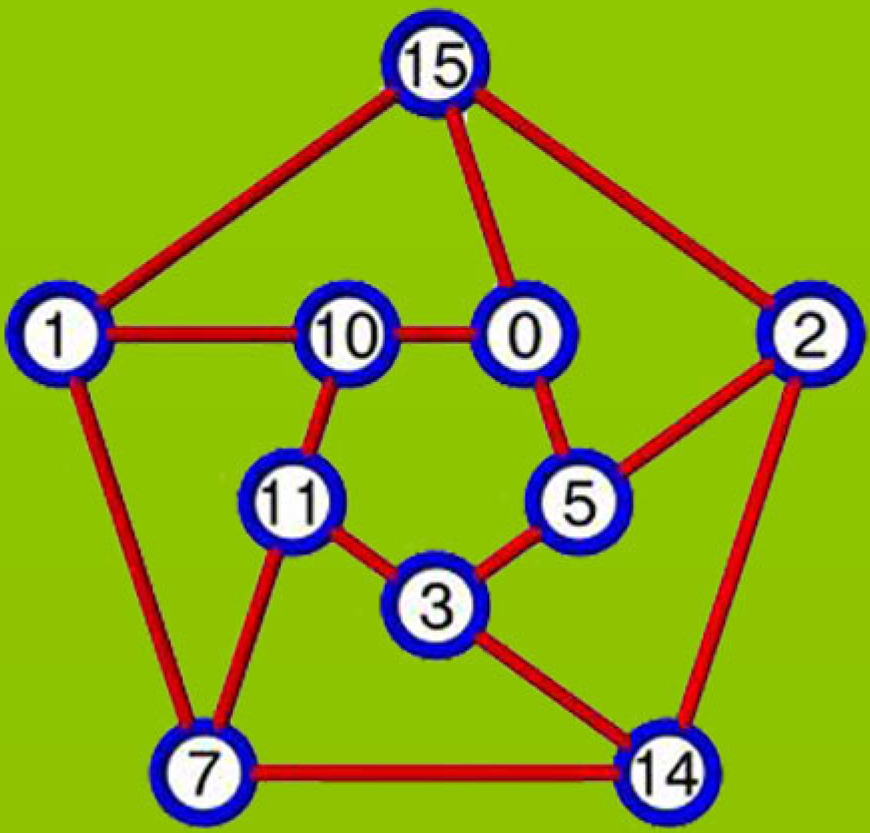

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SQUARE SUM LABELING OF DISJOINT UNION OF GRAPHS

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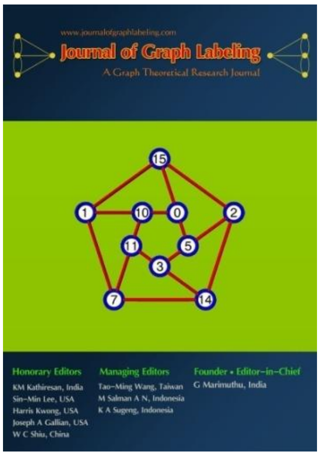

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Abstract

A (p,q) graph G is said to be square sum, if there exists a bijection $f : V(G) \to \{0,1,2,\ldots,p-1\}$ 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. In this paper we prove that if G_1 and G_2 are square sum, then $G_1 \cup G_2 \cup G_3$ is also square sum, where G_3 is a set of isolated vertices.

1 Introduction

All graphs considered here are finite, undirected, and simple. For terminologies and notations not defined in this paper, the reader is referred to [1]. Labeling of a graph G is an assignment of integers either to the vertices or edges or both subject to certain conditions. A dynamic survey to know about the numerous graph labeling methods is regularly updated by J.A. Gallian [4]. Acharya and Germina [2] defined a square sum labeling of a $(p,q)-$graph G as follows.

A $(p,q)-$graph G is said to be square sum, if there exists a bijection $f : V(G) \to \{0,1,2,\ldots,p-1\}$ 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.

Several results on square sum labeling can be found in [3], [5], [6], [7].

2 Results

Theorem 2.1. *Let G_1 and G_2 be square sum graphs then $G_1 \cup G_2 \cup G_3$ is square sum, with $|G_3| = \mathcal{L}$, isolates.*

Proof. Let G_1 be a $(p_1,q_1)-$graph and G_2 be a $(p_2,q_2)-$graph. Let $V(G_1)$ be labeled as $\{v_1,v_2,v_3,\ldots,v_{p_1}\}$ and let the edge set of G_1 be labeled as $\{e_1,e_2,e_3,\ldots,e_{q_1}\}$. Let $V(G_2)$ be labeled as $\{u_1,u_2,u_3,\ldots,u_{p_2}\}$ and let the edge set of G_1 be labeled as $\{e_1^{'},e_2^{'},e_3^{'},\ldots,e_{q_2}^{'}\}$. Without loss of generality let $p_1 \geq p_2$. Since G_1 is square sum there exists a bijection $f : V(G_1) \to \{0,1,2,\ldots,p_1-1\}$ such that the induced function $f^* : E(G_1) \to N$ defined by $f^*(v_iv_j) = (f(v_i))^2 + (f(v_j))^2$, for every $v_iv_j \in E(G_1)$ and $i \neq j$ is injective. Also since G_2 is square sum there exists a bijection, say g, $g : V(G_2) \to \{0,1,2,\ldots,p_2-1\}$ such that the induced function $g^* : E(G_2) \to N$ defined by $g^*(u_mu_n) = (g(u_m))^2 + (g(u_n))^2$, for every $u_mu_n \in E(G_2)$ and $m \neq n$ is injective.