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Research Paper

A VIEW ON AN EDGE PAIR SUM GRAPHS

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Abstract

A graph with an edge pair sum labeling is called an edge pair sum graphs. In this paper we prove that edge pair sum graphs. A graph which admits edge pair sum labeling is called an edge pair sum graphs. The origin of graph theory started with the problem of Konigsberg bridge in 1735.

Keywords:

Pair sum labeling, pair sum graph, edge pair sum labeling, ladder graph, etc

Introduction:

The graph considered here are all finite, undirected simple. The pair sum labeling is introduced by R.Ponraj and they study the edge pair sum labeling of cycle, path, star and some of their related graphs. The Mathematician Leonhard Euler thought about this problem and by solving this problem Euler introduced the new branch of Mathematics namely graph theory. The city of Konigsberg was located on the Pregl River in Prussia. The river divided the city into four regions. These four regions are linked by seven bridges. Residents of the city wondered if it were possible to leave home, cross each of the seven bridges exactly once, and return home.

Theorem

$S(Q_n)$ is a pair sum graph.

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Proof

Let $V(S(Q_n))= \{ x_j: 1\leq j\leq 2n+1\}\cup\{y_j: 1\leq j\leq 3n\}\cup\{z_j:1\leq j\leq 2\, n\}$

and $E(S(Q_n))=\{x_jx_{j+1}:1\leq j\leq 2n\}\cup\{x_{2j+1}z_{2j}, y_{3j}z_{2j}: 1\leq j\leq n\}\cup\{x_{2j-1}z_{2j-1},z_{2j-1}y_{3j-2}: 1\leq j\leq n\}$

$\cup\{y_jy_{j+1}: 1\leq j\leq 3n-1\}-\{y_{3j}y_{3j+1}: 1\leq j\leq n\}$

Case 1. *n* is odd.

S □ Q_1□□is a pair sum graph follows from Theorem

When *n*> 1.

Define g:*V* □*S* □Q_n□□□□□1,□2,…, □□ 7*n*□1□□□ by

g□$x_{n□1}$□□□□□6,

g□x_n□□7,

g□ $x_{n□1}$□□8

g□$x_{n□□}$□□22,

g□$x_{n□2}$□□□□3,

g□ $x_{n□3}$□□□□8

g□$x_{n□4}$)□22

g□$x_{n□1□2j}$□□14*j* □20, 1□ *j* □□ $\frac{n-3}{2}$

g□$x_{n□2□2j}$□□14*j* □22, 1□ *j* □□ $\frac{n-3}{2}$

g□$x_{n□3□2j}$□□□□14j □ 20, 1□□ j □□ $\frac{n-3}{2}$

g□$x_{n□4□2j}$□□□□ 14j □ 22, 1□□ j □□ $\frac{n-3}{2}$

g□z_n□□5,

g□$z_{n□1}$□□4,

g□ $z_{n□2}$□□20

g□$z_{n□1}$□□□□5,

g□$z_{n□2}$□□□□12,

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g□ $z_{n□3}$□□□□20

g□$z_{n□1□2j}$□□14j □10, 1□ j □□□ $\frac{n-3}{2}$

g□$z_{n□2□2j}$□□18□14j , □□ j □□ $\frac{n-3}{2}$

g□$z_{n□2□2j}$□□□□14j □ 10, 1□□ j □□ $\frac{n-3}{2}$

g□$z_{n□3□2j}$□□□□18 □ 14j ,1 □□j □□ $\frac{n-3}{2}$

g□$y_{□3 n □1□/2}$□□ 6,

g□$y_{□3 n□1□/2}$□□ 3

g□$y_{□3 n □3□/2}$ □□□□10,

g□$y_{□ 3 n□5 □/2}$ □□ 16

g□$y_{□3 n □7□/2}$ □□ 18,

g□y□ $_{3 n□3 □/2}$ □□□□7,

g□$y_{□3 n □5□/2}$□□ 14,

g□$y_{□ 3 n□7 □/2 □}$□□□□16

g□$y_{□□□n□□□/□□□□□□□□}$

g□y□$_{3n□3□/2 □3j}$□□ 14j□ 12, 1 □□j□□ $\frac{n-3}{2}$

g□y□$_{3n□5□/2 □3j}$□□ 14j□ 14, 1 □□j □□ $\frac{n-3}{2}$

g □$y_{□3n□7□/2 □3j}$□□ 14j□ 6, 1 □□j□ $\frac{n-3}{2}$

g□y□$_{3n□5□/2 □3j}$□□□□14j□ 12, 1 □□j □□ $\frac{n-3}{2}$ □

g □$y_{□3n□7□/2 □3j}$□□□□14j□ 14, 1 □□j □□ $\frac{n-3}{2}$

g□□y□$_{3n□9□/2 □3j}$□□□□14j□ 6, 1 □□j □□ $\frac{n-3}{2}$

For n = 3

g *e*□*E*□*S*□□*Q*$_n$□□□□□1,2,6,8,9,11,12,15,30,34,38,42□∪
□□□□□□□□□□□□□□□□□□□□□□□□□□1, □2, □6, □8, □9, □ 11, □12, □15, □30, □ 34, □38, □42□.

For *n* □ 3,

g$_e$□*E*□ *S* (*Q*$_n$□□□□□g$_e$□*E*□*S* □
Q$_3$□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□□□□□□□□□46, □50, □54, □56, □58, □62, □68, □70 □,(74, 78,82,84,86,90,96, 98 □,
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□74, □78, □82,□□84, □86, □90, □96, □98 □, ,
□□□□□□□□□□□□□□□□□□□□□□□□□□□14 *n*□ 24,14*n*□ 20,14 *n*□ 16,14 *n*□14,14 *n*□□12,14 *n*□ 8,14 *n*□ 2,14*n*□
□□□14 *n*□ 24, □14 *n*□ 20, □14*n*□16, □14 *n*□14 ,□14 *n*□ 12,□□14 *n*□ 8, □□□□□ *n*□ 2, □14 *n*□□.

Then g is pair sum labeling.

Conclusion

A graph is a collection of points and lines connecting some subset of them. The points of a graph are most commonly known as graph vertices, but may also be called nodes or simply points. Similarly, the lines connecting the vertices of a graph are most commonly known as graph edges, but may also be called Ares or lines.

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