LouisSaveinDupuisJournalofMultidisciplinaryResearch2024,
3:313-320 Doi.: 10.21839/lsdjmr.2024.v3.198

Research Article

Prime Labeling Of Goldner Harary Graph

K. Bharatha Devi,

Research Scholar Department of Mathematics,

Arignar Anna Government Arts College, Villupuram.

Dr.S. Lakshmi Narayanan,

Associate. Professor & Head of department,

Arignar Anna Government Arts College, Villupuram.

Abstract

A graph G = (V (G), E(G)) is observed to admit prime labeling, if a graph that receives prime labeling is called prime graph .In this research article we investigate that the Goldner Harary graph admits prime labeling. We establish prime labeling using some graph operations such as duplication. Switching and fusion with few ideas.

Key words: *Goldner Harary graph, switching, duplication, fusion*.

Introduction

In this we define a connected and undirected graph name **Goldner Harary** graph and we denote the vertex set by V(G) and edge set by E(G) of graph G and their corresponding cardinality by |V(G)| and |E(G)|.Here we establish that **Goldner Harary** graph admits prime labeling.

Definition

In the mathematical field of graph theory, the goldnerharary graph is a simple undirected graph with 11 vertices and 27 edges. It is named after a goldner and frank harary, who proved in 1975 that it was the smallest non Hamiltonian maximal planer graph.

Theorem: 1

The goldner harary graph G is a prime graph

Proof:

Given G be a goldner harary graph

Let $v_1, v_2, \dots, v_{11}$ vertices of G

$V(G)=\{ v_1, v_2, \dots, v_{11} \}$, $E(G)=\{e_1, e_2, \dots, e_{27} \}$

$|V(G)|=11$ $|E(G)|=27$

Now we define the function $f: V(G) \rightarrow \{1,2,\dots,11\}$

such that $f(v_i)=i$, $i=\{1,2,3,5,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$ by $f(v_1)=1$, $f(v_2)=2$, $f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$ $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for i=1,2,3,4,5,6,7,

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_7),f(v_3)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_1)\}=1$

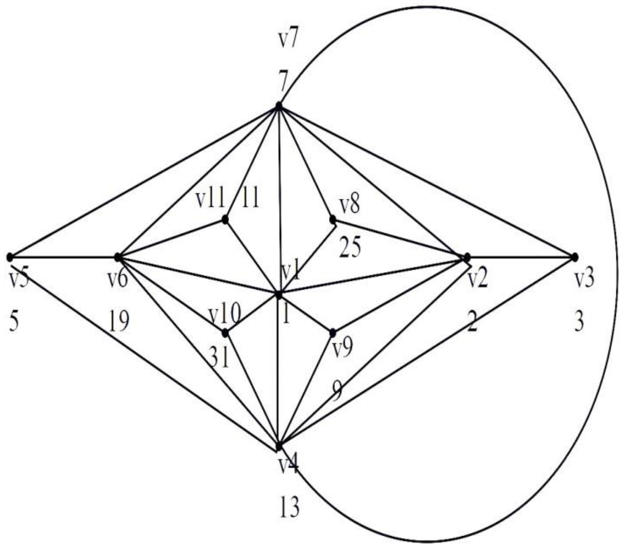
$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(v_7),f(v_4)\}=1$

Gcd{f(v_7),f(v_5)}=1

Gcd{f(v_7),f(v_6)}=1

Gcd{f(v_7),f(v_{11})}=1



As a result, f meets the prime labeling condition. Hence Goldner Harary accept prime labeling.

Theorem: 2

In Goldner harary graph the duplication of any vertex allows prime labelling

Proof:

Consider the Goldnerharary graph which has 11 vertices 27 edges.

Case: 1

Let G be the goldnerharary graph generated by duplicating any vertex

We can consider v_1 to be the duplicating vertex, and let v_1' be the duplication vertex of v_1

Given G be a goldner harary graph

let v_1',v_1 ,v_2 ,…,v_{11} vertices of G

V(G)={ v_1',v_1 ,v_2 ,…,v_{11} }, E(G)={e_1 ,e_2 ,…,e_{35} }

|V (G)|=12 |E (G)|=35

Now we define the function f: V(G) →{1,2,…,11,12}

such that f(v_i)=i , i={1,2,3,5,7,9,11}

f(v_i)=3i+1 , i={4,6,8,10} by

f (v_1')=3i+1, i=12

Which implies f(v_1')=37

f(v_1)=1 , f(v_2)=2 ,f(v_3)=3 , f(v_4)=13 , f(v_5)=5 , f(v_6)=19 , f(v_7)=7 , f(v_8)=25 , f(v_9)=9,

f(v_{10})=31, f(v_{11})=11

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

Gcd{f(v_i),f(v_{i+1}}=1 for i=1,2,3,4,5,6,7,

Gcd{ f(v_8),f(v_2)=1

Gcd{f(v_1),f(v_4)}=1

Gcd{f(v_2),f(v_9)}=1

Gcd{f(v_9),f(v_4)}=1

Gcd{f(v_4),f(v_{10})}=1

Gcd{f(v_{10}),f(v_6)}=1

Gcd{f(v_1),f(v_{10})}=1

Gcd{f(v_1),f(v_{11})}=1

Gcd{f(v_1),f(v_8)}=1

Gcd{f(v_7),f(v_3)}=1

Gcd{f(v_4),f(v_6)}=1

Gcd{f(v_{11}),f(v_6)}=1

Gcd{f(v_7),f(v_1)}=1

Gcd{f(v_1),f(v_9)}=1

Gcd{f(v_7),f(v_4)}=1

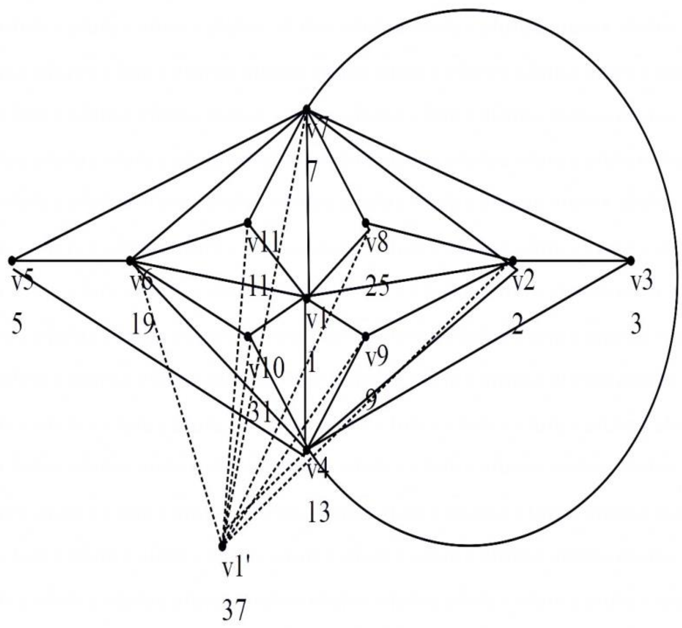
Gcd{f(v_7),f(v_5)}=1

Gcd{f(v_7),f(v_6)}=1

Gcd{f(v_7),f(v_{11})}=1

Gcd{f(v_2),f(v_4)}=1

Gcd{f(v_i), (v_1')}=1 , i=2,4,6,7,8,9,10,11



As a result G admits prime labelling.

Hence G is a prime graph

Case: 2

Let G be the goldnerharary graph generated by duplicating any vertex

We can consider v_7 to be the duplicating vertex, and let v_7' be the duplication vertex of v_7

Given G be a goldner harary graph

let$v_7', v_1, v_2, \ldots, v_{11}$ vertices of G

$V(G)=\{ v_7', v_1, v_2, \ldots, v_{11} \}$, $E(G)=\{e_1, e_2, \ldots, e_{35} \}$

$|V(G)|=12$ $|E(G)|=35$

Now we define the function $f:V(G) \to \{1,2,\ldots,11,12\}$

such that $f(v_i)=i$,

$i=\{1,2,3,5,7,9,11\}$ $f(v_i)=3i+1$,

$i=\{4,6,8,10\}$ by

$f(v_7')=3i+1$, $i=12$

Which implies $f(v_7')=37$

$f(v_1)=1$, $f(v_2)=2$,$f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$, $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for $i=1,2,3,4,5,6,7$,

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_7),f(v_3)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_1)\}=1$

$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(v_7),f(v_4)\}=1$

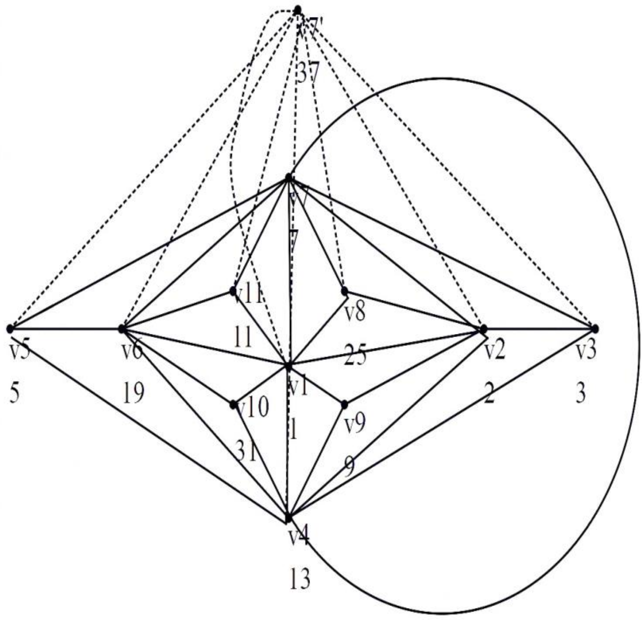
$Gcd\{f(v_7),f(v_5)\}=1$

$Gcd\{f(v_7),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_{11})\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_i),f(v_7')\}=1$, $i=1,2,3,4,5,6,8,11$



As a result G admits prime labelling.

Hence G is a prime graph.

Case: 3

Let G be the goldnerharary graph generated by duplicating any vertex

We can consider v_{11} to be the duplicating vertex, and let v_{11}' be the duplication vertex of v_{11}

given G be a goldnerharary graph

let $v_{11}', v_1, v_2, \ldots, v_{11}$ vertices of G

$V(G)=\{ v_{11}', v_1, v_2, \ldots, v_{11} \}$, $E(G)=\{e_1, e_2, ..., e_{30} \}$

$|V(G)|=12$ $|E(G)|=30$

Now we define the function $f:V(G) \to \{1,2,\ldots,11,12\}$

such that $f(v_i)=i$, $i=\{1,2,3,5,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$ by

$f(v_{11}')=3i+1$, $i=12$

which implies $f(v_{11}')=37$

$f(v_1)=1$, $f(v_2)=2$,$f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$, $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for $i=1,2,3,4,5,6,7$, Gcd{ $f(v_8),f(v_2)$=1

Gcd{$f(v_1),f(v_4)$}=1

Gcd{$f(v_2),f(v_9)$}=1

Gcd{$f(v_9),f(v_4)$}=1

Gcd{$f(v_4),f(v_{10})$}=1

Gcd{$f(v_{10}),f(v_6)$}=1

Gcd{$f(v_1),f(v_{10})$}=1

Gcd{$f(v_1),f(v_{11})$}=1

Gcd{$f(v_1),f(v_8)$}=1

Gcd{$f(v_7),f(v_3)$}=1

Gcd{$f(v_4),f(v_6)$}=1

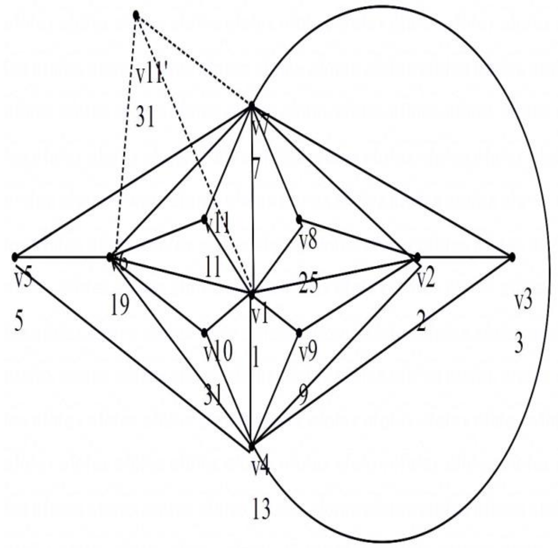
Gcd{$f(v_{11}),f(v_6)$}=1

Gcd{$f(v_7),f(v_1)$}=1

Gcd{$f(v_1),f(v_9)$}=1

Gcd{$f(v_7),f(v_4)$}=1

Gcd{$f(v_i)$, (v_{11}')}=1 , i=1,6,7



As a result G admits prime labelling.

Hence G is a prime graph

Theorem: 3

The graph obtained by switching of a vertex v_1 in a Goldner harary graph admits prime labeling.

Proof:

Consider the prism graph which has 11 vertices and 27 edges

Case: 1

Let G_u denotes the graph obtained by vertex switching of Goldner harary graph with respect to the vertex V_1

$|V(G_u)|=11$ $|E(G_u)|=21$

Now we define the function $f:V(G) \rightarrow \{1,2,\ldots,11\}$

such that $f(v_i)=i$, i={1,2,3,5,7,9,11}

$f(v_i)=3i+1$, i={4,6,8,10} by

$f(v_1)=1$, $f(v_2)=2$,$f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$, $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify.

We look at the following types of edges:

Gcd{$f(v_i),f(v_{i+1}$}=1 for i=2,3,4,5,6,7,

Gcd{ $f(v_8),f(v_2)$=1

Gcd{$f(v_2),f(v_9)$}=1

Gcd{$f(v_9),f(v_4)$}=1

Gcd{$f(v_4),f(v_{10})$}=1

Gcd{$f(v_{10}),f(v_6)$}=1

Gcd{$f(v_7),f(v_3)$}=1

Gcd{$f(v_4),f(v_6)$}=1

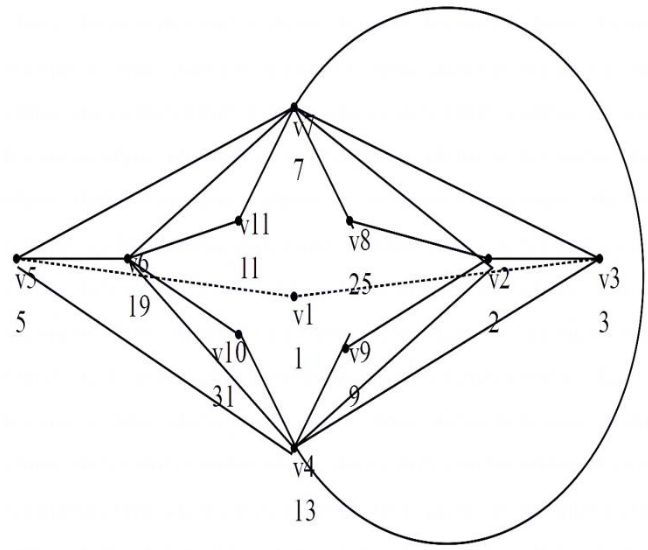
Gcd{$f(v_{11}),f(v_6)$}=1

Gcd{$f(v_3),f(v_1)$}=1

Gcd{$f(v_5),f(v_1)$}=1

Gcd{$f(v_7),f(v_4)$}=1

Gcd{$f(v_2),f(v_4)$}=1



Thus f is a prime labeling and consequently G_u is prime graph.

Therefore the switching of a vertex v_1 in a Goldner Harary graph admits prime labeling.

Case: 2

Let G_u denotes the graph obtained by vertex switching of Goldner Harary graph with respect to the vertex V_7

$|V(G_u)|=11$ $|E(G_u)|=21$

Now we define the function $f:V(G_u) \rightarrow \{1,2,\ldots,11\}$

such that $f(v_i)=i$, $i=\{1,2,3,5,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$ by

$f(v_1)=1$, $f(v_2)=2$,$f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$, $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for i=1,2,3,4,5,6,

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

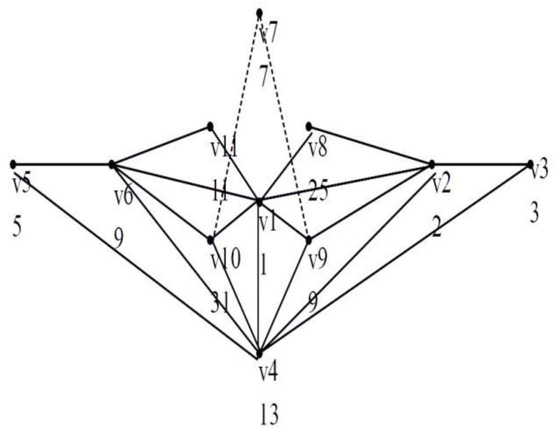
$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(v_7),f(v_9)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$



Thus f is a prime labeling and consequently G_u is prime graph.

Therefore the switching of a vertex v_7 in a Goldner Harary graph admits prime labeling.

Case: 3

Let G_u denotes the graph obtained by vertex switching of Goldner Harary graph with respect to the vertex V_{11}

$|V(G_u)|=11$ $|E(G_u)|=32$

Now we define the function $f:V(G) \rightarrow \{1,2,\ldots,11\}$

such that $f(v_i)=i$, $i=\{1,2,3,5,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$ by

$f(v_1)=1$, $f(v_2)=2$,$f(v_3)=3$, $f(v_4)=13$, $f(v_5)=5$, $f(v_6)=19$, $f(v_7)=7$, $f(v_8)=25$, $f(v_9)=9$,

$f(v_{10})=31$, $f(v_{11})=11$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for i=1,2,3,4,5,6,7,

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_8),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_7),f(v_3)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_2)\}=1$

$Gcd\{f(v_7),f(v_1)\}=1$

$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(v_7),f(v_4)\}=1$

$Gcd\{f(v_7),f(v_5)\}=1$

$Gcd\{f(v_7),f(v_6)\}=1$

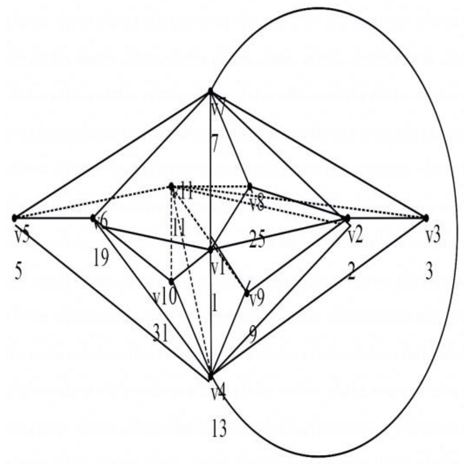
$Gcd\{f(v_9),f(v_{11})\}=1$

$Gcd\{f(v_{11}),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_{10})\}=1$

$Gcd\{f(v_5),f(v_{11})\}=1$

$Gcd\{f(v_3),f(v_{11})\}=1$



Thus f is a prime labeling and consequently G_u is prime graph.

Therefore the switching of a vertex v_{11} in a Goldner Harary graph admits prime labeling.

Theorem: 4

The graph obtained by fusing of vertices v_7 and v_3 in a Goldner Harary admits prime labeling.

Proof:

Consider Goldner Harary which has 11 vertices and 27 edges

Case: 1

$V(G)=\{ v_1, v_2, \ldots, v_{11}\}$, $E(G)=\{e_1, e_2, \ldots, e_{27}\}$

$|V(G)|=11$ $|E(G)|=27$

Let G^1 be a graph obtained by fusion of two vertices v_7 and v_3

Let the fusion vertex be u.

Then $|V(G^1)|=10$ $|E(G^1)|=24$

Define a labeling f: $V(G^1)\rightarrow\{1,2,\ldots,11\}$

such that $f(v_i)=i$, $i=\{1,2,3,5,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$

$f(v_3)=f(u)$, $i=3$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for $i=1,2,4,5,6$

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(u),f(v_5)\}=1$

$Gcd\{f(v_1),f(v_9)\}=1$

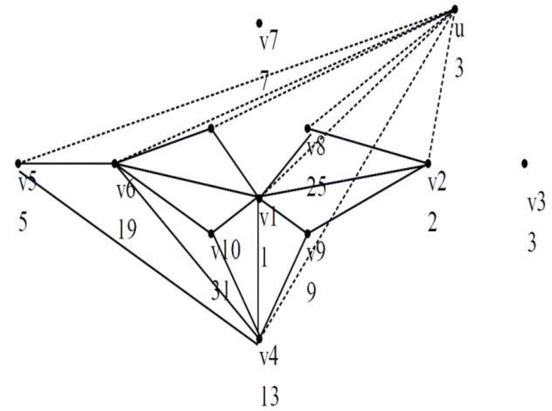
$Gcd\{f(u),f(v_4)\}=1$

$Gcd\{f(u),f(v_6)\}=1$

$Gcd\{f(u),f(v_8)\}=1$

$Gcd\{f(u),f(v_{11}\}=1$

$Gcd\{f(u),f(v_2\}=1$



Thus f is a prime labeling and consequently G^1 is a prime graph.

Therefore, fusion of vertices v_7 and v_3 in a Goldner Harary graph admits prime labeling.

Case: 2

$V(G)=\{ v_1, v_2, \ldots, v_{11}\}$, $E(G)=\{e_1, e_2, \ldots, e_{27}\}$

$|V(G)|=11$ $|E(G)|=27$

Let G^1 be a graph obtained by fusion of two vertices v_7 and v_5

Let the fusion vertex be u.

Then $|V(G^2)|=10$ $|E(G^2)|=24$

Define a labeling f: $V(G^2)\rightarrow\{1,2,\ldots,10\}$

such that $f(v_i)=i$, $i=\{1,2,3,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$

$f(v_7)=f(u)$, $i=7$

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for i=1,2,3,4,6,

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(u),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(u),f(v_6)\}=1$

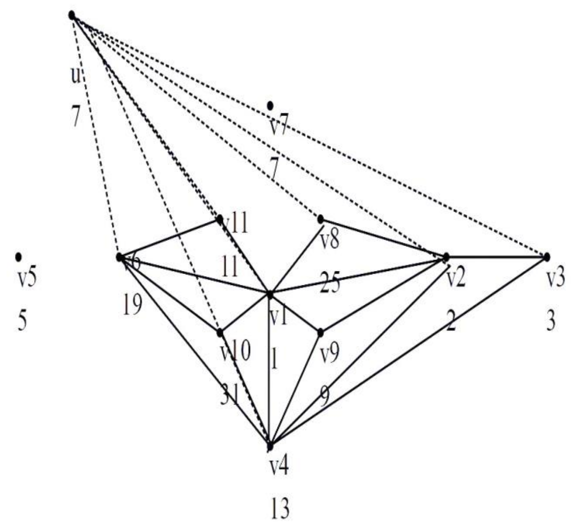
$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(u),f(v_{11})\}=1$

$Gcd\{f(u),f(v_8)\}=1$

$Gcd\{f(u),f(v_2)\}=1$

$Gcd\{f(u),f(v_3)\}=1$



Thus f is a prime labeling and consequently G^2 is a prime graph.

Therefore, fusion of vertices v_7 and v_5 in a Goldner Harary graph admits prime labeling.

Case: 3

$V(G)=\{ v_1 ,v_2 ,\ldots,v_{11}\}$, $E(G)=\{e_1 ,e_2 ,\ldots,e_{27} \}$

$|V(G)|=11$ $|E(G)|=27$

Let G^3 be a graph obtained by fusion of two vertices v_4 and v_5

Let the fusion vertex be u.

Then $|V(G^3)|=10$ $|E(G^3)|=24$

Define a labeling f: $V(G^3)\rightarrow\{1,2,\ldots,10\}$

such that $f(v_i)=i$, $i=\{1,2,3,7,9,11\}$

$f(v_i)=3i+1$, $i=\{4,6,8,10\}$

$f(v_4)=f(u)$, i=4

The relative prime of adjacent vertices have to be verify

We look at the following types of edges:

$Gcd\{f(v_i),f(v_{i+1}\}=1$ for i=1,2,3,6,7

$Gcd\{ f(v_8),f(v_2)=1$

$Gcd\{f(v_1),f(v_4)\}=1$

$Gcd\{f(v_2),f(v_9)\}=1$

$Gcd\{f(v_9),f(v_4)\}=1$

$Gcd\{f(v_4),f(v_{10})\}=1$

$Gcd\{f(v_{10}),f(v_6)\}=1$

$Gcd\{f(v_1),f(v_{10})\}=1$

$Gcd\{f(v_1),f(v_{11})\}=1$

$Gcd\{f(v_1),f(v_8)\}=1$

$Gcd\{f(v_7),f(v_3)\}=1$

$Gcd\{f(v_4),f(v_6)\}=1$

$Gcd\{f(v_2),f(v_4)\}=1$

$Gcd\{f(v_{11}),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_1)\}=1$

$Gcd\{f(v_1),f(v_9)\}=1$

$Gcd\{f(v_7),f(v_4)\}=1$

$Gcd\{f(v_7),f(v_6)\}=1$

$Gcd\{f(v_7),f(v_{11})\}=1$

$Gcd\{f(u),f(v_7)\}=1$

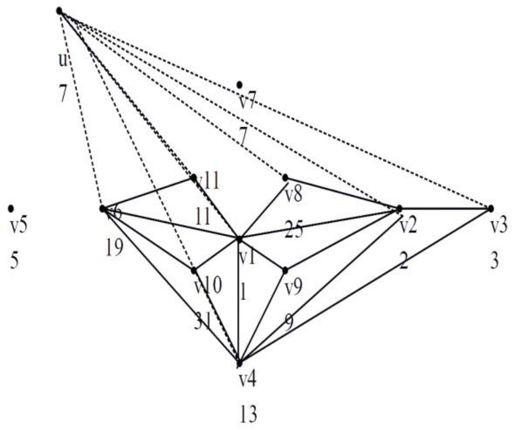
$Gcd\{f(u),f(v_6)\}=1$

$Gcd\{f(u),f(v_{10})\}=1$

$Gcd\{f(u),f(v_9)\}=1$

$Gcd\{f(u),f(v_2)\}=1$

$Gcd\{f(u),f(v_3)\}=1$



Thus f is a prime labeling and consequently G^3 is a prime graph.

Therefore, fusion of vertices v_5 and v_4 in a Goldner Harary graph.

Conclusion

In this Paper, we discussed Goldner Harary graph admits Prime Labeling.

Reference

J.A. Bondy and U.S.R. Murthy,

"Graph Theory and Applications",(North-Holland), New York (1976)

Tout, A.N. Dabboucy and K. Howalla,
"Prime labeling of graph", Nat. Acad. Sci Letters, 11(1982) 365-368.

M. Zakaria Youssef and Z. SaadAlmoreed,
"On odd prime labeling of graphs," Open L. Discret. Appl. Math, vol. 3, nob 3,pp. 33-40, Oct. 2020.

H. Carter and N.B. Fox,
"Odd prime labeling," ArXiv, Aug. 2022, Accessed: Oct.25, 2022.

G. Gajalakshmi and S. Meena,
"On Odd Prime Labeli9ngsd of Snake Related Graphs," J AlgebrStst, vol. 13,no 1,pp630-634.2022

J.A Gallian, A dynamic survey of graph labeling,

The electronic journal of combinations, 16(22017)# DS6

S.Lavanya and Dr.V.Ganesan .
Vertex Prime Labeling of umbrella graph U (m, n). International Journal of Innovative Research in science, Engineering and Technology, 9 (11) (20220), 10364-10368.

Dr.R.Ganesan, A.Bhalamurugan and Christy ,
Prime Labeling for some new classes of Graphs, International Journal of Research and Analytical Reviews,6(2)(2019),232-235.

T.Deretsky ,S.M.Lee and J.Mitchem,
On Vertex Prime Labeling of Graphs in Graph Theory, Combinatorics and Applications, Proceeding 6th International Conference Theory and Application of Graphs (Wiley, New York 1991),359-369.