

An Acyclic Coloring of H- graph and Fan Graph

N. Ramya

Department of Mathematics, Bharath University, Chennai, Tamil Nadu, India

ABSTRACT: We present a unique way of acyclic coloring of H- graph, and Fan graph.

KEYWORDS: Acyclic Coloring, H- graph, Fan graph[5].

I. INTRODUCTION

Graph Coloring is a special case of graph Labelling. It is an assignment of Labels traditionally called colors to elements of a graph subject to certain constraints. In its simplest form, it is a way of coloring the vertices of a graph such that no two adjacent vertices share the same color. The first result about graph coloring deal almost exclusively with planar graph in the form of coloring of maps[6]. While trying to color a map of the countries of England, Guthrie [1] postulated the four color conjecture, nothing that four colors were sufficient to color the map so that no regions sharing a common border receives the same color[7]. The problem was presented earlier by August Mobins [2].

The smallest number of colors needed to color a graph G is called its chromatic number. In a graph G, any cycle in G is not bicolored is called acyclic coloring [3,4].

An H- graph $H(r)$, is a 3- regular graph with vertex set $\{(i,j) : 1 \leq i \leq 3; 1 \leq j \leq 2r\}$ and edge set $\{(i,j), (i,j+1) \mid i = 1,3, 1 \leq j \leq 2r-1\} \cup \{(1,1), (1,n), (3,1), (3,n)\} \cup \{(i,j), (i+1,j+1), i = 1,2, 1 \leq j \leq 2r\}$ [5].

II. MAIN RESULTS

Theorem 1:-

An H- graph $H(r)$ is a 3- regular graph. We prove, Acyclic Chromatic number of $H(r)$ is 3[8].

Proof:-

Coloring has to be given as;

Step1:-

The left arm of $H(1)$ can be labeled as 1,2,3 and right arm of the $H(1)$ can be labeled as 2,3,1.

Step 2:-

We labeled $H(1)$ as given in Step 1. $H(2)$ can be labeled as, in addition to the $H(1)$, in $H(2)$ left arm of $H(2)$ can be labeled as 1,2,3 and right arm can be labeled as 3,2,1.

Step3:-

We labeled $H(1)$, $H(2)$ as given in Step1,2. Similarly $H(3)$ can be labeled as, left arm of $H(3)$ can be labeled as 1,2,3 and right arm can be labeled as 2,3,1.

Step 4:-

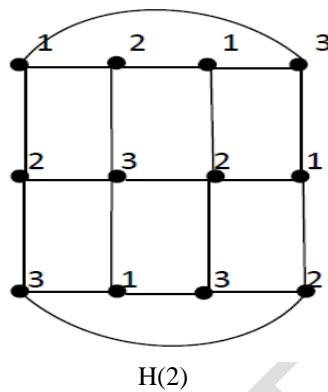
In general, in $H(r)$, if r is odd, in left arm 1 is always incident with 2 and 3 is incident with 1 if r is even, in left arm first vertex 1 is incident with the last vertex 3. Similarly the last vertex 3 is incident with 2.

**International Journal of Innovative Research in Science,
Engineering and Technology**

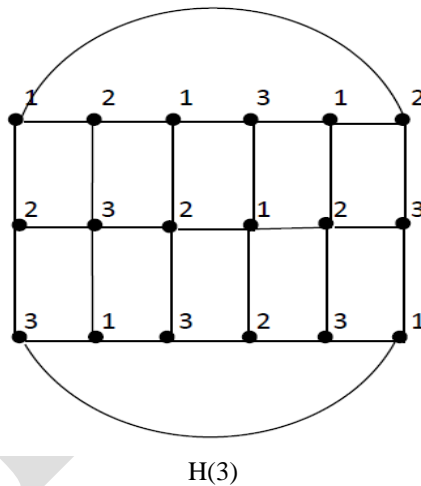
(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 12, December 2014

Example 1:-
If r is even



Example 2:-
If r is odd



Theorem 2:-

Acyclic Chromatic number of Fan graph is always 3.[9]

Proof:-

Step 1:-

In Fan graph, central vertex has to be colored '1'. Then the wings of the graph has to be given 2,3.

Step2:-

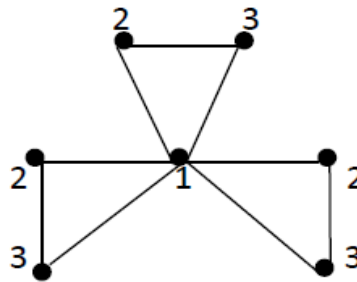
If the wings of the fan increases, the acyclic chromatic number does not change. It remains 3.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

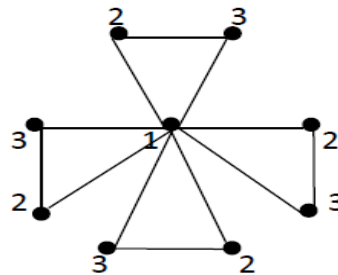
Vol. 3, Issue 12, December 2014

Example 1:-



Acyclic Chromatic number is 3.

Example 2:-



Acyclic chromatic number is 3.

III. CONCLUSION

Hence Acyclic Coloring has been given for H- graph and Fan graph by unique way. Similarly we can give coloring by programming concepts.

REFERENCES

- [1] Bollobas.B "MODERN GRAPHTHEORY" ,Graduate texts in Mathematics,vol.184.,springer-verlag,1998.
- [2].Kiran B., Kareem S.A., Illamani V., Chitralekha S., "Case of Phthiriasis palpebrarum with blepheroconjunctivitis", Indian Journal of Medical Microbiology, ISSN : 0255-0857, 30(3) (2012) PP. 354-356..
- [3]Chartand,G.;Johns.G.L., Mc Keon,K.A and Zlang,P. "RAINBOW CONNECTION IN GRAPHS",Math.Bohem.vol.133,PP 85-98.2008
- [4].Jayaraman B., Valiathan G.M., Jayakumar K., Palaniyadi A., Thenumgal S.J., Ramanathan A., "Lack of mutation in p53 and H-ras genes in phenytoin induced gingival overgrowth suggests its non cancerous nature", Asian Pacific journal of cancer prevention : APJCP, ISSN : 13(11) (2012) PP. 5535-5538.
- [5] Chakraborty.S.;Fisher,E.,Matsliah,A.and Yuster, R. "HARDNESS AND ALGORITHMS FOR RAINBOW CONNECTION,"J.Combin.optimization,PP,1-18,2009.
- [6].Kalaiselvi V.S., Saikumar P., Prabhu K., Prashanth Krishna G., "The anti Mullerian hormone-a novel marker for assessing the ovarian reserve in women with regular menstrual cycles", Journal of Clinical and Diagnostic Research, ISSN : 0973 - 709X, 6(10) (2012) PP.1636-1639.
- [7].N.Ramya, K.Rangarajan "ON EDGEMAGIC LABELING OF SOME GRAPHS" IJPAM,vol6,no.4,PP277-281,2013
- [8].Subhashree A.R., Shanthi B., Parameaswari P.J., "The Red Cell Distribution Width as a sensitive biomarker for assessing the pulmonary function in automobile welders- a cross sectional study", Journal of Clinical and Diagnostic Research, ISSN : 0973 - 709X, 7(1) (2013) PP. 89-92.
- [9].Gopalakrishnan K., Prem Jeya Kumar M., Sundeep Aanand J., Udayakumar R., "Analysis of static and dynamic load on hydrostatic bearing with variable viscosity and pressure", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) PP.4783-4788.