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On Star Chromatic Number of $P_3^{(n)}$

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Abstract

We illustrate a coloring and star coloring of $P_3^{(n)}$,for every n≥3,and also distinguish the relation between them.

Keywords: Coloring, Star Coloring, $P_3^{(n)}$ Path Graph

1. Introduction

In 1973Grunbaum introduced star coloring. Let G denote a graph with vertex set v;we shall assume that G contains 1 or 2 circuits(i.e. loops or multiple edges).A coloring of G is a partition $V=V_1UV_2U.....UV_k$ of the vertices of G into k pairwise disjoint sets(called colors)so that adjacent vertices are in different sets(have different colors).

A star coloring of a graph is a proper coloring such that no path on 4 vertices is 2-colored[1,2].

Recall that a proper coloring of a graph is an assignment of colors to the vertices of the graph such that adjacent vertices are assigned different colors.

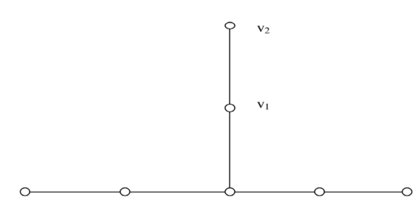
2. Main Results

Result 1: A graph $P_3^{(n)}$ n≥3 has chromatic number is always 2.

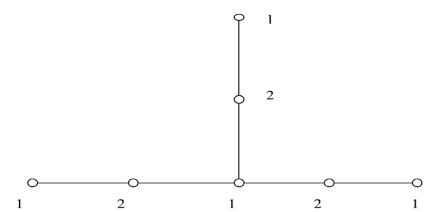
We can give the coloring by following ways:

1. f(u)=1.
2. $f(v_1)=2,f(x_1)=2,f(w_1)=2$.
3. $f(v_2)=1,f(x_2)=1,f(w_2)=1$.

Fig



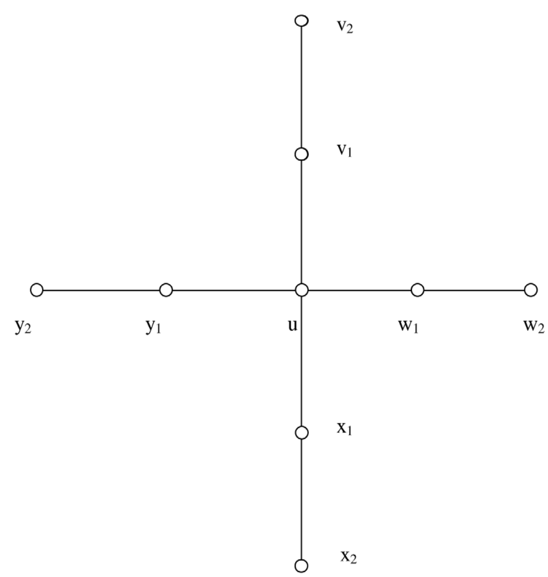
Example: If n=3 ,then the graph $p_3^{(3)}$ has chromatic number as follows.



Thus the chromatic number $P_3^{(3)}$ is 2.

Result 2: A graph $P_3^{(n)}$ n≥3, has star chromatic number is 3 [3].

We can define the vertex set from the following figure.



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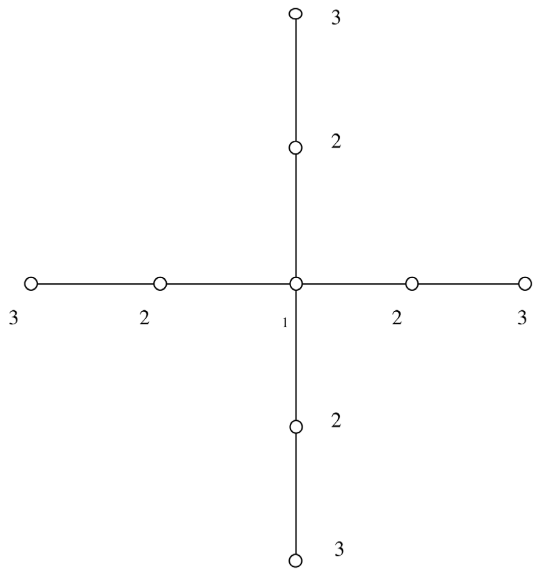
Star coloring has to be given,

1. f(u)=1.
2. $f(v_1)=2, f(w_1)=2, f(x_1)=2, f(y_1)=2$.
3. $f(v_2)=3, f(w_2)=3, f(x_2)=3, f(y_2)=3$.

Example: If n=4,then graph $P_3^{(4)}$ has star chromatic number as follows:



Hence $\psi_s(P_3^{(4)})=3$.

If the copies will be increases, then we can give the coloring by the same way.

3. Conclusion

Hence we conclude that this type of graph ,the chromatic number $\psi(G)$ is less than star chromatic number $\psi_s(G)$.

It is of interest to extend this coloring for directed graphs.

4. References

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