International J.Math. Combin. Special Issue 1 (2018), 197-206

A Note on Support Neighbourly Irregular Graphs

Selvam Avadayappan, M. Bhuvaneshwari and R. Sinthu

(Research Department of Mathematics, VHNSN College, Virudhunagar - 626 001, India)

E-mail: selvamavadayappan@yahoo.co.in, bhuvaneshwari@vhnsnc.edu.in, sinthumaths@yahoo.co.in

Abstract: In any graph G, the support of a vertex is the sum of degrees of its neighbours. A connected graph G is said to be support neighbourly irregular (or simply SNI), if no two adjacent vertices in G have same support. In this paper, the necessary and sufficient conditions for some known families of graphs to be SNI have been discussed.

Key Words: Irregular graphs, support neighbourly irregular graphs, subdivision graphs, splitting graphs.

AMS(2010): 05C25.

§1. Introduction

Only finite, simple, connected, undirected graphs are considered in this paper. We refer [11] for further notations and terminology. The degree of a vertex v is denoted by *d(v)*. A *full vertex* of G is a vertex which is adjacent to every other vertices of G. A graph G is said to be r - *regular*, if every vertex of G has degree r. For $r \neq k$, a graph G is said to be *(r,k) - biregular* if *d(v)* is either r or k for any vertex v in G.

In a graph *G(V, E)*, for any vertex $v \in V$, the *open neighbourhood* of v is the set of all vertices adjacent to v. That is, $N(v) = \{u \in V(G)/\ uv \in E(G)\}$. The *closed neighbourhood* of v is defined by $N[v] = N(v) \cup v$. Clearly, if $N[u]=[v]$, then u and v are adjacent and $d(u) = d(v)$.

Let G_1 and G_2 be any two graphs. The graph $G_1 \circ G_2$ obtained from one copy of G_1 and $|V(G_1)|$ copies of G_2 by joining each vertex in the i^{th} copy of G_2 to the i^{th} vertex of G_1 is called the *corona* of G_1 and G_2.

The concept of support of a vertex has been introduced and studied by Selvam Avadayappan and G. Mahadevan [6]. The *support s(v)* of a vertex v is the sum of degrees of its neighbours. That is, $s(v) = \sum_{u \in N(v)} d(u)$. Note that the support of any vertex in an r - *regular* graph is r^2.

A graph G is said to be a *balanced graph,* if any two vertices in G have the same support. It is easy to observe that the complete bipartite graphs $K_{m,n}$ and any regular graphs are balanced graphs. A graph G is said to be *highly unbalanced,* if distinct vertices of G have distinct

[1]Proceedings of the *International Conference on Discrete Mathematics and its Applications*, Manonmaniam Sundaranar University, January 18-20, 2018.

[2]Received January 30, 2018, Accepted May 19, 2018, Edited by R. Kala.