A NOTE ON ODD DISTANCE GRAPHS

Selvam Avadayappan and M. Bhuvaneshwari
Research Department of Mathematics,
V.H.N. Senthikumara Nadar College, Virudhunagar – 626001, India.
e-mail: selvam_avadayappan@yahoo.co.in
bhuvaneshwari@vhnsnc.edu.in

Abstract

Let $G(V, E)$ be any connected graph. A path is called an odd path if it is of odd length. The odd distance graph $OD(G)$ of a graph G has the vertex set V and two vertices in $OD(G)$ are adjacent if and only if the distance between them is odd. In this paper, we prove some results on odd distance graphs. Also we characterise the graphs for which odd distance graph is complete bipartite. In addition, we prove that odd distance graph of almost all graphs are self centered of radius two.

Keywords: odd distance graphs, self centered graphs.

AMS Subject Classification Code(2010): 05C (Primary)

1 Introduction

The graphs taken under consideration in this paper are finite, simple, undirected and connected. For notations and terminology, we follow [5]. Let n denote the number of vertices in a graph G. A vertex v is said to be a *full vertex* if degree of v is $n – 1$. The *distance $d(u,v)$* [6], between any two vertices u and v is the length of a shortest path between them.

The *eccentricity $e(u)$* of a vertex u is the distance of a farthest vertex from u. The *radius rad(G)* of G is the minimum eccentricity and the *diameter, diam(G)* of G is the maximum eccentricity of the graph G. A graph G for which $rad(G) = diam(G)$ is called a *self – centered graph* of radius $rad(G)$. A vertex v is called an *eccentric vertex* of a vertex u if $d(u,v) = e(u)$.

The concept of eccentric graphs was introduced in [1] and studied in detail by Chartrand et al., in [7]. The *eccentric graph G_e* of a graph G is a graph with vertex set $V(G)$ and any two vertices in G_e are adjacent if and only if $d(u,v) = min\{e(u), e(v)\}$.

The antipodal graphs were introduced and further developed by R.Aravamuthan and B. Rajendran in [2] and [3]. The *antipodal graph* of a graph G denoted by $A(G)$, is the graph on the same vertices of G and two vertices in $A(G)$ are adjacent if the distance between them is equal to the diameter of G. A graph is said to be antipodal if it is the antipodal graph of some graph H.

Inspired by these two concepts, Km. Kathiresan and Marimuthu [8] have introduced a new type of graphs called radial graphs. Two vertices of a graph G are said to be *radial* to each other if the distance between them is equal to the radius of the graph.