On the path partition dimension of a graph

Verman Ruxandra
Faculty of Mathematics and Computer Science,
University of Bucharest,
Str. Academiei, 14,
010014 Bucharest, Romania
E-mail: verman@fmi.unibuc.ro

Abstract

For a graph G and any two vertices u and v in G, let $d(u,v)$ denote the distance between u and v and let $d(G)$ be the diameter of G. For a subset S of $V(G)$, the distance between v and S is $d(v,S) = min\{d(v,x) \mid x \in S\}$. Let $\Pi = \{S_1, S_2, \ldots, S_k\}$ be an ordered k-partition of $V(G)$. The representation of v with respect to Π is the k-vector $r(v \mid \Pi) = (d(v,S_1), d(v,S_2), \ldots d(v,S_k))$. Π is a resolving partition for G if the k-vectors $r(v \mid \Pi)$, $v \in V(G)$ are distinct. The minimum k for which there is a resolving k-partition of $V(G)$ is the partition dimension of G, and is denoted by $pd(G)$. $\Pi = \{S_1, S_2, \ldots, S_k\}$ is a path resolving k-partition for G if is a resolving partition and each subgraph $< S_i >$ induced by S_i, $1 \le i \le k$, is a path. The minimum k for which there exists a path resolving k-partition of $V(G)$ is the path partition dimension of G, denoted by $ppd(G)$. In this paper the path partition dimensions of some classes of well-known graphs are determined and connected graphs of order $n \ge 3$ having path partition dimension 2, n or $n-1$ are characterized.

Keywords: distance, metric dimension, partition dimension, path partition dimension, resolving partition, path resolving partition, eccentricity.