ON THE RATIO BETWEEN PARTITION DIMENSION AND METRIC DIMENSION OF A CONNECTED GRAPH

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Abstract

In this paper it is shown that the ratio between partition dimension and metric dimension of a connected graph of order n can be arbitrarily small as $n \to \infty$, but the connected graph satisfying this property has the connected partition dimension greater than its metric dimension. This graph is an induced subgraph of the infinite graph $(\mathbb{Z}^2, \mathcal{E}_4)$, where the set of vertices is the set of points of the integer lattice and the set of edges consists of all pairs of vertices whose city block distance is equal to one. This solves an open problem raised by Chartrand, Salehi and Zhang [4], [5]. Also, a new short proof of the characterization of graphs of order $n \geq 3$ having partition dimension equal to $n - 1$ given by Chartrand, Salehi and Zhang [4] is proposed.

Keywords: metric dimension, partition dimension, connected partition dimension, basis, resolving set, integer lattice, city block distance, diametral vertex, eccentricity.

AMS subject classification: 05C12