

ABSTRACT

LOCAL AND NONLOCAL COMPLEMENT METRIC DIMENSION ON SIERPINSKI GASKET GRAPHS AND HANOI GRAPHS

by

Aditia Permana

24010123410004

The metric dimension of graphs has developed into several variations, including the nonlocal metric dimension and the complement metric dimension. The combination of the complement metric dimension and the nonlocal metric dimension leads to the concept of the nonlocal complement metric dimension as a further development in the study of metric dimension. A set is called a nonlocal complement resolving set if there exist two nonadjacent vertices that have the same representation with respect to the set. The nonlocal complement metric dimension is defined as the minimum cardinality of a nonlocal complement resolving set. In this study, the concept of the nonlocal complement metric dimension is applied to the Sierpinski Gasket graph and the Hanoi graph. Furthermore, the relationships between the pairs of metric dimensions, namely the local–complement local and the nonlocal–complement nonlocal metric dimensions, are analyzed for both graphs. The results show that the local and nonlocal metric dimensions of both graphs remain constant as the order of the graph increases, whereas the complement local and complement nonlocal metric dimensions increase with the increase of n . In addition, the union of the local–complement local resolving sets as well as the nonlocal–complement nonlocal resolving sets does not cover all vertices of the graph, and the sum of their dimensions is not equal to the number of vertices. Therefore, the relationships between the local–complement local and the nonlocal–complement nonlocal metric dimensions do not exhibit a complementary relationship.

Keywords: resolving set, representation, self-similar graph, distance, cardinality.