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FAULT-TOLERANT METRIC DIMENSION OF AMALGAMATION OF CYCLES

Hazrul Iswadi

Department of MIPA and Department of Industrial Engineering
Universitas Surabaya
Raya Kalirungkut Street, Surabaya 60292, Indonesia
hazrul_iswadi@yahoo.com

Abstract. For an ordered set $W = \{w_1, w_2, \cdots, w_k\}$ of vertices and a vertex v in a connected graph G, the representation of v with respect to W is the ordered k-tuple $r(v|W) = (d(v, w_1), d(v, w_2), \cdots, d(v, w_k))$ where $d(x, y)$ represents the distance between the vertices x and y. The set W is called a resolving set for G if every vertex of G has a distinct representation. A resolving set containing a minimum number of vertices is called a basis for G. The (metric) dimension of G, denoted by $\dim(G)$, is the number of vertices in a basis of G. The idea of metric dimension is initiated by Slater (1975) and Harary and Melter (1976) independently. Some researchers (Chartrand *et.al.* (2000), Chartrand and Zhang (2003), and Slater (1998)) have found some fundamentals results in the study of metric dimension of graphs.

Let $\{G_i\}$ be a finite collection of graphs and each G_i has a fixed vertex v_{oi} called a terminal. The amalgamation $\text{Amal}\{G_i, v_{oi}\}$ is formed by taking of all the G_i's and identifying their terminals. Carlson (2006) stated clearly the definition of amalgamtion of graphs. Iswadi *et.al.* (2010) determined the metric dimension of the amalgamation of cycles. They found its metric dimension only depend on the number of cycles in amalgamation.

A resolving set S for G is fault-tolerant if $S - \{v\}$ is also a resolving set, for each v in S, and the fault-tolerant metric dimension of G is the minimum cardinality of such a set. Slater (2002) introduced the study of single-fault-tolerant locating-dominating sets. Hernando *et.al.* (2013), and Iswadi (2013) have investigated dan determined the fault-tolerant metric dimension of trees and amalgamation of cycles containing odd number of vertices, respectively. In this paper, we will continue to determine the fault-tolerant metric dimension of amalgamation of cycles for any number of vertices.

Key words and Phrases: Metric dimension, basis, amalgamation, fault-tolerant.

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