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SOME CLASSES OF DISPERSIBLE DCSL-GRAPHS

A distance compatible set labeling (dcsl) of a connected graph G is an injective set assignment $f : V(G) \to 2^X$, X being a non empty ground set, such that the corresponding induced function $f^{\oplus} : E(G) \to 2^X \setminus \{\varphi\}$ given by $f^{\oplus}(uv) = f(u) \oplus f(v)$ satisfies $|f^{\oplus}(uv)| = k^f_{(u,v)} d_G(u,v)$ for every pair of distinct vertices $u, v \in V(G)$, where $d_G(u,v)$ denotes the path distance between u and v and $k^f_{(u,v)}$ is a constant, not necessarily an integer, depending on the pair of vertices u, v chosen. G is distance compatible set labeled (dcsl) graph if it admits a dcsl. A dcsl f of a (p,q)-graph G is dispersive if the constants of proportionality $k^f_{(u,v)}$ with respect to $f, u \neq v, u, v \in V(G)$ are all distinct and G is dispersible if it admits a dispersive dcsl. In this paper we proved that all paths and graphs with diameter less than or equal to 2 are dispersible.

Key words and phrases: set labeling of graphs, dcsl graphs, dispersible dcsl graphs.

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INTRODUCTION

Acharya [1] introduced the notion of vertex set valuation as a set analogue of number valuation. For a graph $G = (V, E)$ and a non empty set X, Acharya defined a set valuation of G as an injective set valued function $f : V(G) \to 2^X$, and he defined a set-indexer as a set valuation such that the function $f^{\oplus} : E(G) \to 2^X \setminus \{\varphi\}$ given by $f^{\oplus}(uv) = f(u) \oplus f(v)$ for every $uv \in E(G)$ is also injective, where 2^X is the set of all the subsets of X and $\oplus$ is the binary operation of taking the symmetric difference of subsets of X.

Acharya and Germina, who has been studying topological set valuation, introduced the particular kind of set valuation for which a metric, especially the cardinality of the symmetric difference, is associated with each pair of vertices in proportion to the distance between them [2]. In otherwords, the question is whether one can determine those graphs $G = (V, E)$ that admit an injective function $f : V \to 2^X$, X being a non empty ground set such that the cardinality of the symmetric difference $f^{\oplus}(uv)$ is proportional to the usual path distance $d_G(u,v)$ between u and v in G, for each pair of distinct vertices u and v in G. They called f a *distance compatible set labeling* (dcsl) of G, and the ordered pair (G, f), a distance compatible set labeled (dcsl) graph. Thus

Definition 1 ([2]). *Let $G = (V, E)$ be any connected graph. A distance compatible set labeling (dcsl) of a graph G is an injective set assignment $f : V(G) \to 2^X$, X being a non empty*

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