Characterization of 1-uniform dcsl graphs and learning graphs

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Abstract. 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 $f^{\oplus} : E(G) \to 2^X \setminus \{\phi\}$ given by $f^{\oplus}(u, v) = f(u) \oplus f(v)$ satisfies $|f^{\oplus}(u, v)| = k^f_{(u,v)} d_G(u, v)$ 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. A dcsl f of G is k-uniform if all the constants of proportionality with respect to f are equal to k, and if G admits such a dcsl then G is called a k-uniform dcsl graph. Let $\mathcal{F}$ be a family of subsets of a set X. A graph G is defined to be a learning graph, if it is a $\mathcal{F}$-induced graph of some learning space $\mathcal{F}$. In this paper, we characterize 1-uniform dcsl learning graphs and discuss the embedding problems.

Keywords: dcsl graphs, 1−uniform dcsl graphs, wg-family of sets, learning graphs.

1. Introduction

Throughout this paper by a graph we mean a connected, finite, simple graph. Unless otherwise mentioned, for all terminology in graph theory the reader is referred to [4]. 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

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