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On Integer Additive Set-Valuations of Finite Jaco Graphs

Research Article

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Abstract. Let X denote a set of non-negative integers and $\mathcal{P}(X)$ be its power set. An integer additive set-labeling (IASL) of a graph G is an injective set-valued function $f:V(G)\to\mathcal{P}(X)-\{\emptyset\}$ where induced function $f^+:E(G)\to\mathcal{P}(X)-\{\emptyset\}$ is defined by $f^+(uv)=f(u)+f(v)$, where f(u)+f(v) is the sumset of f(u) and f(v). Let f(x)=mx+c; $m\in\mathbb{N}$, $c\in\mathbb{N}_0$. A finite linear Jaco graph, denoted by $J_n(f(x))$, is a directed graph with vertex set $\{v_i:i\in\mathbb{N}\}$ such that (v_i,v_j) is an arc of $J_n(f(x))$ if and only if $f(i)+i-d^-(v_j)\geq j$. In this paper, we discuss the admissibility of different types of integer additive set-labeling by finite linear Jaco graphs.

Keywords. Integer additive set-labeled graphs; Weak integer additive set-labeled graphs; Arithmetic integer additive set-labeled graphs; Dispensing number of a graph; Finite linear Jaco graph

MSC. 05C78; 05C75; 05C62

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1. Introduction

For all terms and definitions, not defined specifically in this paper, we refer to [2, 3, 5, 25]. Unless mentioned otherwise, all graphs considered here are simple, finite, non-trivial and connected.

Motivated by several problems in social interactions, the notion of the set-valuation or set-labeling of graphs was introduced in [1] as an injective set assignment of G in which the vertices of G are labeled by the subsets of a ground set X according certain rules. A graph with

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