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Arithmetic integer additive set-valued graphs: a creative review

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Abstract

For a non-empty ground set X , finite or infinite, the set-valuation or set-labeling of a given graph G is an injective function $f: V(G) \rightarrow P(X)$, where $P(X)$ is the power set of the set X . A set-indexer of a graph G is an injective set-valued function $f: V(G) \rightarrow P(X)$ such that the function $f^*: E(G) \rightarrow P(X) - \{\emptyset\}$ defined by $f^*(uv) = f(u) * f(v)$ for every $uv \in E(G)$ is also injective, where $*$ is a binary operation on sets. Let No be the set of all non-negative integers and $P(No)$ is its power set. An integer additive set-labeling (IASL) of a graph G is an injective function $f: V(G) \rightarrow P(No)$ such that the induced function $f^*: E(G) \rightarrow P(No)$ defined by $f^*(uv) = f(u) + f(v)$, where $f(u) + f(v)$ is the sumset of the sets $f(u)$ and $f(v)$. An IASL f of a graph G is said to be an integer additive set-indexer (IASI) of G if the induced function f^* is also injective. In this paper, we critically and creatively review the concepts and properties of a particular type of integer additive set-valuation, called arithmetic integer additive set-valuation of graphs.

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