cogent
mathematics

CrossMark

PURE MATHEMATICS | REVIEW ARTICLE

A review on graceful and sequential integer additive set-labeled graphs

N.K. Sudev[1]*, K.P. Chithra[2] and K.A. Germina[3]

Abstract: Let $\mathbb{N}_0$ be the set of all non-negative integers and $\mathscr{P}$ be its power set. Then, an integer additive set-labeling (IASL) of a graph G is an injective function $f:V(G) \to \mathscr{P}(\mathbb{N}_0)$, such that the induced function $f^+:E(G) \to \mathscr{P}(\mathbb{N}_0)$ defined by $f^+(uv) = f(u) + f(v)$ and an integer additive set-indexer (IASI) is an integer additive set-labeling such that the induced function $f^+:E(G) \to \mathscr{P}(\mathbb{N}_0)$ is also injective. An integer additive set-labeling (or an integer additive set-indexer) is said to be a graceful integer additive set-labeling (or graceful integer additive set-indexer) if $f^+(E(G)) = \mathscr{P}(X) - \{\emptyset, \{0\}\}$ and an integer additive set-labeling (or an integer additive set-indexer) is said to be a sequential integer additive set-labeling (or an integer additive set-indexer) if $f(V(G)) \cup f^+(E(G)) = \mathscr{P}(X) - \{\emptyset\}$. In this write-up, we creatively and critically review certain studies made on graceful integer additive set-labeling and sequential integer additive set-labeling of given graphs and certain properties and characteristics of the graphs which satisfy this type of set-labelings.

Subjects: Advanced Mathematics; Discrete Mathematics; Mathematics & Statistics; Pure Mathematics; Science

Keywords: integer additive set-labeled graphs; integer additive set-graceful graphs; integer additive set-sequential graphs

AMS subject classifications: 05C78

ABOUT THE AUTHORS

N.K. Sudev is a Professor (Associate) in the Department of Mathematics, Vidya Academy of Science and Technology, Thrissur, India., for the last fifteen years. His primary research areas are Graph Theory and Combinatorics. He has forty-five research papers in International Journals. He is a referee for many journals and premiere reviewing services.

K.P. Chithra is an independent researcher in Mathematics. Her primary research area is also Graph Theory. She Possess twelve international publications in Graph Theory and related areas.

K.A. Germina is currently a Professor in Mathematics in University Botswana, Gaborone, Botswana. She has more than two decades of teaching experience and fifteen years of research experience. She has more than hundred research publications and she is the reviewer and editor for many journals and premiere reviewing services.

PUBLIC INTEREST STATEMENT

Graph Labeling problems have numerous applications in various fields. Various graph labeling types are the result of many practical considerations. Different types of labeled graphs have become highly useful in modeling a wide range of applications such as routing, transportation, communication networks, Optimization, and social interactions. Different types of set-labeling problems mainly originated as an effective method to model social relations and interactions. Graceful and sequential labeling are some types of optimal set-assignments to elements of a graph subject to some specific predefined conditions. So these types of set-labelings have significant applications in optimization and distribution networks.

N.K. Sudev