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EDGE ITALIAN DOMINATION IN GRAPHS

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Abstract: An edge Italian dominating function (EIDF) of a graph $G = (V, E)$ is a function $f : E(G) \to \{0, 1, 2\}$ such that every edge e with $f(e) = 0$ is adjacent to some edge e' with $f(e') = 2$ or at least two edges e_1, e_2 with $f(e_1) = f(e_2) = 1$. The weight of an edge Italian dominating function is $\sum_{e \in E(G)} f(e)$. The edge Italian domination number of a graph G is defined as the minimum weight of an edge Italian dominating function of G and is denoted by $\gamma'_I(G)$. In this paper, we initiate a study on the edge Italian domination in graphs.

Keywords and Phrases: Roman Domination, Italian Domination, Edge Italian Domination, Edge Italian dominating function, Edge Italian Domination number.

2020 Mathematics Subject Classification: 05C70.

1. Introduction

Let G be a simple connected graph with vertex set $V(G)$ and edge set $E(G)$. A subset S of the vertex set V is called a dominating set of G if every vertex not in S is adjacent to some vertex in S. The domination number, $\gamma(G)$, of G is the minimum cardinality taken over all dominating sets of G.

Mitchell and Hedetniemi [7] introduced the concept of edge domination in graphs. A subset F of edges of a graph G is called an edge dominating set of G if every edge not in F is adjacent to some edge in F. The edge domination number of G, denoted by γ', is the minimum cardinality taken over all edge dominating sets of G.