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TRIPLE CONNECTED ETERNAL DOMINATION IN GRAPHS

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Abstract. The concept of Triple connected domination number was introduced by G. Mahadevan et. al., in [10]. The concept of eternal domination in graphs was introduced by W. Goddard., et. al., in [3]. The dominating set $S_0(\subseteq V(G))$ of the graph G is said to be an eternal dominating set, if for any sequence $v_1, v_2, v_3, \dots v_k$ of vertices, there exists a sequence of vertices $u_1, u_2, u_3, \dots u_k$ with $u_i \in S_{i-1}$ and u_i equal to or adjacent to v_i, such that each set $S_i = S_{i-1} - \{u_i\} \cup \{v_i\}$ is dominating set in G. The minimum cardinality taken over the eternal dominating sets in G is called the eternal domination number of G and it is denoted by $\gamma_\infty(G)$. In this paper we introduce another new concept Triple connected eternal domination in graph. The eternal dominating set $S_0(\subseteq V(G))$ of the graph G is said to be a triple connected eternal dominating set, if each dominating set S_i is triple connected. The minimum cardinality taken over the triple connected eternal dominating sets in G is called the triple connected eternal domination number of G and it is denoted by $\gamma_{tc,\infty}(G)$. We investigate this number for some standard graphs and obtain many results with other graph theoretical parameters.

Keywords: Triple connected domination number, Eternal domination in graphs, Triple connected eternal domination number of graphs.

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1. Introduction

By a graph we mean a finite, simple, connected and undirected graph $G(V, E)$, where V denotes its vertex set and E its edge set. Unless otherwise stated, the graph G has p vertices and q edges. We denote a cycle on m vertices by C_m, a path on m vertices by P_m, a complete graph on m vertices by K_m and a complete bipartite graph on m, n vertices by $K_{m,n}$. We denote a prism graph on n vertices by Y_n, $n \geq 3$ is defined by Cartesian product of a cycle with a single edge. The ladder graph can be obtained as the Cartesian Product of two paths, one of which has only one edge, denoted by L_n, $n \geq 1$. In [9], J. Paulraj

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