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TOTAL DOMINATING SETS AND TOTAL DOMINATION POLYNOMIAL OF WHEEL

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ABSTRACT

For a graph G with order n then total domination polynomial $D_t(G,x)=\sum_{i=\gamma_t(G)}^{n} d_t(G,i)x^i$ where, $d_t(G,i)$ is the number of total dominating sets of G of cardinality i. In this paper,I have obtained the total dominating sets and total domination polynomial of the wheel W_n.

Keywords: Dominating Set, Total Dominating Set, Domination Polynomial

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1. INTRODUCTION

We begin with a simple, finite, connected and undirected graph $G=(V(G),E(G))$. For a vertex $v \in V(G)$, the open neighborhood $N(v)$ of v is defined as $N(v)=\{u \in V(G) \,/\, uv \in E(G)\}$. The number of distinct subsets with r vertices that can be selected from a set with $|V(G)|$ vertices are $\binom{|V(G)|}{r}=\frac{|V(G)|!}{(|V(G)|-r)!\cdot r!}$. The number $\binom{|V(G)}{r}$ is called a binomial coefficient. In this paper, denote the set $\{1,2,3,\ldots,n\}$ by $[n]$.

The wheel W_n with $n+1$ vertices is defined to be the join of K_1 and C_n. The vertex corresponding to K_1 is known as an apex while the vertices corresponding to C_n are known as rim vertices.

For a graph G, the set $D \subseteq V(G)$ of vertices is called a dominating set if every vertex $v \in V(G)$ is either an element of D or is adjacent to an element of D. The minimum cardinality of a dominating set of G is called the domination number of G which is denoted by $\gamma(G)$. There are many variants of dominating sets such as total dominating set, global dominating set, equitable dominating set, etc. are among worth to mention a few. A subset D of $V(G)$ is called a total dominating set of G if $N(D)=V(G)$ or if every vertex $v \in V(G)$ is adjacent to at least one element in D or if $< D >$ has no isolated vertices. The minimum cardinality of total dominating set is called the total domination number of a graph G which is denoted by $\gamma_t(G)$. The concept of total domination was introduced by Cockayne *et al.*in [2] and further explored by Vaidya and