**Strong Domination Polynomial of Wheel Graph**

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**Abstract**

Let $G = (V, E)$ be a simple graph. A set $S \subseteq V$ is called as a dominating set if every vertex $v \in V$ is either a member of $S$ or adjacent to a member of $S$. A set $S \subseteq V$ is a strong dominating set of $G$ if for every $u \in V - S$, there exists a $v \in S$ such that $uv \in E$ and $\deg(u) \leq \deg(v)$. Let $W_m$ be a wheel graph with order $m$. Let $Sd(W_m^j)$ be the family of strong dominating sets of a wheel graph $W_m$ with the number of elements in the set $j$, and let $Sd(W_m,j) = |Sd(W_m^j)|$. In the paper, we establish $W_m$ and obtain an iterative formula for $Sd(W_m,j)$. Using this iterative formula, we consider the polynomial $SD(W_m, x) = \sum_{j=\gamma_{sd}(W_m)}^{m} Sd(W_m^j, j) x^j$, we call strong domination polynomial of wheel graphs and obtain some examples of this polynomial.

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