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ON VERTEX POLYNOMIAL

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Abstract

Let G be a graph. The vertex polynomial of the graph G is defined as

$$V(G;x) = \sum_{k=0}^{\Delta(G)} v_k x^k$$

where $\Delta(G) = \max\{deg(v)/v \in V(G)\}$ and v_k is the number of vertices of degree k. In this paper we find the vertex polynomial of Complete graph, Cyclic graph, Cubic graph, Peterson graph, Complete bipartite graph, Contraction graph and Antiregular graph. Moreover in this paper we prove the relation between vertex polynomial of disjoint graphs G_1, G_2 and $G_1 \boxplus G_2$ where $G1 \boxplus G_2$ is the graph obtained from $G_1 + G_2$ and joining every vertex of G_1 to every vertex of G_2. Also we prove the reduction formula for Antiregular graph and discuss the nature of the Antiregular graph's vertex polynomial. After that we construct Max to max graph, Leaf graph, Stem graph and Leaf and Stem graph and find their vertex polynomial.

Key Words : *Maximum degree, Vertex Polynomial, Complete graph, Stem graph, Leaf graph, Leaf and Stem graph.*

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