The K-Distance Neighborhood Polynomial of a Graph

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Abstract : In a graph G = (V, E), the distance from a vertex v to a vertex u is the length of shortest v to u path. The eccentricity e(v) of v is the distance to a farthest vertex from v. The diameter diam(G) is the maximum eccentricity. The k-distance neighborhood of v, for $0 \leq k \leq e(v)$, is Nk(v) = {u ϵ V (G) : d(v, u) = k}. In this paper, we introduce a new distance degree based topological polynomial of a graph G is called a k- distance neighborhood polynomial, denoted Nk(G, x). It is a polynomial with the coefficient of the term k, for $0 \leq k \leq e(v)$, is the sum of the cardinalities of Nk(v) for every v ϵ V (G). Some properties of k- distance neighborhood polynomials are obtained. Exact formulas of the k- distance neighborhood polynomial for some well-known graphs, Cartesian product and join of graphs are presented.