Journal of Algebra and Applied Mathematics
Vol. 24 (2026), No.1, pp.37-53
ISSN: 2319-7234

URL : www.sasip.net

Polynomial derived from the vertex covers of the graph induced by the convex subsets of a graph*

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Abstract. Convexity in a graph is defined based on specific path-based properties. A set of vertices is considered convex if, for any two vertices within the set, all the shortest paths between them remain entirely within the set. In this paper, we introduced the polynomial derived from the vertex convers of the graph induced by the convex subsets of a graph. We formulated this polynomial in some special graphs such as complete graphs and complete bipartite graphs. Moreover, the formula for finding the polynomial of the join of two path graphs were established.

AMS Subject Classification (2020): 05C69, 05C75

Keywords: Vertex cover, convex sets, graph polynomial, neighborhood system

*The authors would like to thank Department of Science and Technology - Accelerated Science and Technology Human Resource Department Program (DOST-ASTHRDP), Philippines and MSU - Iligan Institute of Technology (Iligan City, Philippines) for funding this research.
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