

Hosoya Polynomials of Mycielskian Graphs

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Abstract : Vulnerability measures and topological indices are crucial in solving various problems such as the stability of the communication networks and development of mathematical models for chemical compounds. In 1947, Harry Wiener introduced a topological index related to molecular branching. Now there are more than 100 topological indices for graphs. For example, Hosoya polynomials (also called Wiener polynomials) were introduced to derive formulas for certain vulnerability measures and topological indices for various graphs. In this paper, we will find a relation between the Hosoya polynomials of any graph and its Mycielskian graph. Additionally, using this we will compute vulnerability measures, closeness and betweenness centrality, and extended Wiener indices. It is fascinating to see how Hosoya polynomials are useful in the two diverse fields, cybersecurity and chemistry.

Keywords : hosoya polynomial, mycielskian graph, graph vulnerability measure, topological index

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