Hosoya Polynomials for Graph Vulnerability Measures and Topological Indices

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Vulnerability measures and topological indices are crucial in solving various problems such as assessment of 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. In my paper, *Computation of Graph Vulnerability Measures and Topological Indices*, which is published in Congressus Numerantium 2017, I established formulas for certain vulnerability measures and topological indices for various graphs. In this paper, I will continue to establish formulas for vulnerability measures such as Residual Closeness and topological indices such as hyper-Wiener index for various graphs. I will do this by computing Hosoya polynomials (also called Wiener polynomials) and their derivatives. It is amazing to see how Hosoya polynomials give powerful tools for fields of Communications and Chemistry.

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