

The Tutte Polynomial of Phenylene Systems with given number of branching hexagons

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Abstract

Polynomial graph invariants have been confirmed to have important applications in quantum chemistry and biological information. One of the famous polynomial graph invariants is the Tutte polynomial which gives multifarious interesting information about the graph structure. In this paper, we first give a simpler and more efficient method to get the Tutte polynomials of alternating polycyclic chains. Then we obtain the explicit expressions for the Tutte polynomials and the number of spanning trees of phenylene systems with given number of branching hexagons. Moreover, we determine the extremal values of the number of spanning trees among the phenylene systems with given one or two branching hexagons, and the corresponding extremal phenylene systems are characterized, respectively.

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