

Cut Method: Update on Recent Developments and Equivalence of Independent Approaches

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Abstract

The cut method is a powerful tool for the investigation of distance-based (and some other) molecular structure-descriptors. In this paper a survey on the recent developments of the method is given. The instances of the standard cut method for the Wiener index, the Szeged index, the PI index, the generalized terminal Wiener index, the Gutman index, the edge-Wiener index, and the edge-Szeged index are described, where a standard cut method is a method that applies to partial cubes. It is pointed out that the standard cut method was recently independently discovered a couple of times. Numerous proper extensions of the standard cut method are presented. The method extends to ℓ_1 -graphs, graphs with a non-trivial canonical metric representation, graphs with transitive relation Θ , and partial Hamming graphs. The instances of these extended cut methods include the Wiener index, the degree distance, distance moments, and the colored Wiener index.

Keywords: Cut method, topological index, QSPR/QSAR, partial cube, Wiener index, Szeged index, PI index, terminal Wiener index, isometric embedding, distance moment, colored Wiener index.

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