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Wiener index under gated amalgamations

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Abstract

A subgraph H of a graph G is gated if for every x V(G) there exists a vertex u in H such that $d_G(x, v) = d_G(x, u) + d_G(u, v)$ for any v V(H). The gated amalgam of graphs G_1 and G_2 is obtained from G_1 and G_2 by identifying their isomorphic gated subgraphs H_1 and H_2. Two theorems on the Wiener index of gated amalgams are proved. Several known results on the Wiener index of (chemical) graphs are corollaries of these theorems which we demonstrate by gated amalgams of trees and benzenoid systems.

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