

INVERTED DISTANCE AND INVERTED WIENER INDEX

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**Abstract**

The Wiener index is the sum of distances between all pairs of vertices of a (connected) graph. In this paper we defined two novel graph invariants; the inverted distance and the inverted Wiener index. The inverted distance of between any two different vertices  $u$  and  $v$  of a simple connected graph  $G$  defined as;  $i(u, v) = D - d(u, v) + 1$  where  $D$  denotes the diameter of  $G$  and  $d(u, v)$  denotes the distance of the vertices  $u$  and  $v$ . The inverted Wiener index of a simple connected graph  $G$  defined as;  $IW(G) = \sum_{u \neq v} i(u, v)$  where the sum is taken over unordered pairs of vertices of  $G$ . We characterized maximum trees with respect to the inverted Wiener index.

**Keywords:** inverted distance; inverted Wiener index; Wiener index; average inverted distance

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