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WIENER INVARIANTS OF PRODUCT OF GRAPHS

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ABSTRACT. The Wiener index of a connected graph Λ, denoted by $W(\Lambda)$, is defined as $\frac{1}{2}\sum_{u,v\in V(\Lambda)} dist_\Lambda(u,v)$. In this paper, we present the explicit formulae for the Wiener invariant of tensor product of a given graph and a complete bipartite graph.

1. INTRODUCTION

A topological invariant is a numerical descriptor of a molecule, based on a certain topological feature of the corresponding molecular graph. A representation of an object giving information only about the number of elements composing it and their connectivity is named as topological representation of an object. One of the most widely known topological descriptor is the Wiener invariant named after chemist Harold Wiener. The Wiener invariant [2] of a graph is defined as $W(\Lambda) = \frac{1}{2}\sum_{u,v\in V(\Lambda)} dist_\Lambda(u,v)$.

The reverse Wiener invariant was proposed by Balaban et al. in 2000 [3], it turns out that this invariant is important for a reverse problem and also found applications in modeling of structure-property relations [3, 4]. The reverse-Wiener invariant is defined as follows $\Lambda(\Lambda) = \frac{1}{2}n(n-1)D(\Lambda) - W(\Lambda)$, where n is the number of vertices and $D(\Lambda)$ is the diameter of Λ. Some mathematical properties of the reverse Wiener invariant may be found in [5–7].

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