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Talk On the Wiener index of Sierpiński graphs pp.: 1–4

On the Wiener index of Sierpiński graphs

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Abstract

Wiener index of graph G is defined as sum of distances of all pairs of vertices. In this paper, the Wiener index of Sierpiński graphs is computed and explicit formula is obtained.

Keywords: Wiener index, Sierpiński graphs, Total distance
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1 Introduction

Sierpiński graphs S_k^n were introduced by S. Klavzar and Milutinovic in [2] The graph S_k^1 is the complete graph in k vertices and S_3^n are isomorphic to the tower of Hanoi graphs. Mathematical properties of the graph S_k^n have been well studied. For example a classification of their covering codes is given in [1] metric properties of Sierpiński graphs were studied in [3] and [4] . The S_k^n can be defined recursively with the following process: S_k^1 is a complete graph. To construct S_k^{n+1}, consider S_k^n and adding exactly one edge between each pair of copies. When $k = 2$ then S_k^n is isomorphic to P_{2^n} and in the case $k = 3$ these graphs are exactly tower of Hanoi graphs. The structure of tower of Hanoi graph is illustrated in Fig 1. The vertices of S_k^n can be identified with words of size n on alphabet

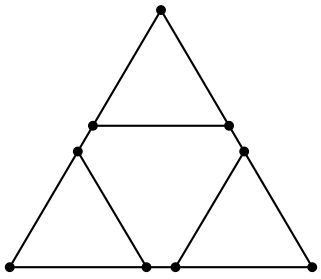

Figure 1: Structure of Sierpiński graph S_3^n

$\{1, 2, \cdots, k\}$. Let $u = (u_1, u_2, \cdots, u_n)$ and $v = (v_1, v_2, \cdots, v_n)$ be two different vertices. u and v are adjacent if and only if there exists $i \in \{1, 2, \cdots, k\}$ such that

- $u_t = v_t$ for $1 \leq t \leq i - 1$

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