South East Asian J. of Mathematics and Mathematical Sciences
Vol. 21, No. 2 (2025), pp. 43-52

DOI: 10.56827/SEAJMMS.2025.2102.3 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

ON THE SPECTRAL CHARACTERISTICS OF SIGNLESS LAPLACIAN MATRIX

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(**Received:** *Jun. 01, 2025* **Accepted:** *Aug. 09, 2025* **Published:** *Aug. 30, 2025)*

Abstract: In this paper, we present a comprehensive study on the spectral properties of the signless Laplacian matrix of the maximal graph. Specifically, we characterize the spectral radius of the signless Laplacian matrix of the maximal graph $M(\Gamma(\mathbb{Z}_n))$. Moreover, we study the smallest signless Laplacian eigenvalue of the maximal graph and introduce an interaction with the algebraic connectivity of $M(\Gamma(\mathbb{Z}_n))$ for some definite values of n. Finally, we derive an explicit formula for the Wiener index in terms of signless Laplacian eigenvalues of the graph.

Keywords and Phrases: Signless Laplacian Spectrum, Maximal Graph, Wiener Index.

2020 Mathematics Subject Classification: 05C50, 05C25, 05C75.

1. Introduction

In this paper, we consider only undirected simple graph $G(V, E)$, with vertex set V and edge set E and we denote two vertices v_i and v_j are adjacent by $v_i \sim v_j$. Adjacency matrix of a graph G is defined as $A(G) = (a_{ij})_{n\times n}$, $a_{ij} = 1$ and 0 according as v_i is adjacent to v_j or not. The difference between diagonal matrix $D(G)$,