

KASHVI-TOSHA STRESS INDEX FOR GRAPHS

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Abstract. We introduce a new topological index for graphs called Kashvi-Tosha stress index using stresses of nodes. Also, we establish some inequalities, prove some results and compute Kashvi-Tosha stress index for some standard graphs. Further, a QSPR analysis is carried for Kashvi-Tosha stress index and physical properties of lower alkanes and linear regression models have been provided.

Keywords. Graph, Neighborhood of a node, Stress of a node, Path, Geodesic, Topological index.

AMS (MOS) subject classification: 05C05, 05C07, 05C09, 05C38, 05C92.

1 Introduction

We refer to the textbook of Harary [2] for standard terminology and concepts in graph theory. This article will provide non-standard information when needed.

Let $G = (V, E)$ be a graph (finite, simple, connected and undirected). The distance between two nodes u and v in G , denoted by $d(u, v)$ is the number of edges in a shortest path (also called a graph geodesic) connecting them. We say that a graph geodesic P is passing through a node v in G if v is an internal node of P .

The concept of stress of a node in a network (graph) has been introduced by Shimmel as centrality measure in 1953 [22]. This centrality measure has applications in biology, sociology, psychology, etc., (See [4, 20]). The stress of a node v in a graph G , denoted by $\text{str}_G(v)$ or $\text{str}(v)$, is the number of geodesics passing through it. We denote the maximum stress among all the nodes of G by Θ_G and minimum stress among all the nodes of G by θ_G . Further, the concepts of stress number of a graph and stress regular graphs have been studied by K. Bhargava, N. N. Dattatreya, and R. Rajendra in their paper [1]. A graph G is k -stress regular if $\text{str}(v) = k$ for all $v \in V(G)$. For