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NIRMALA STRESS INDEX OF GRAPHS AND ITS APPLICATIONS

HARISHCHANDRA S. RAMANE AND MALLAPPA P. MELLIKERI

Abstract. The stress of a vertex v, denoted by $st(v)$ is defined as the number of shortest paths in the graph G passing through the internal vertex v. The Nirmala index based on the degrees of the vertices have been studied by many researchers. In this paper we define Nirmala stress index of a graph G based on the stress of vertices as $NS(G) = \sum_{uv \in E(G)} \sqrt{st(u) + st(v)}$, where $E(G)$ is an edge set of G. We compute the Nirmala stress index of some graphs and of wheel related graphs. Also we obtain the bounds for the Nirmala stress index. Further we carry a linear regression analysis of the Nirmala stress index with the physicochemical properties of benzenoid hydrocarbons to test the predictive potential of Nirmala stress index. The regression analysis shows that the correlation of the Nirmala stress index with the physicochemical properties of the benzenoid hydrocarbons is good compared to the results existing in the literature.

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Karnatak University
Department of Mathematics
Dharwad – 580003, India
Email address: hsramane@yahoo.com, hsramane@kud.ac.in

Karnatak University
Department of Mathematics
Dharwad – 580003, India
Email address: mallappamellikeri@gmail.com