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# GENERAL RANDIĆ ENERGY OF SOME GRAPHS

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**Abstract:** For a graph $G$ of order $n$, the general Randić matrix $GR(G) = [g_{ij}]$ is a symmetric matrix of order $n$ in which $g_{ij} = (d_i d_j)^{\alpha}$, $\alpha \in \mathbb{R}$ if the vertices $v_i$ and $v_j$ are adjacent in $G$ and 0, otherwise, where $d_i$ is the degree of vertex $v_i$. The general Randić energy $E_{GR}(G)$ of $G$ is the sum of the absolute values of the eigenvalues of $GR(G)$. In this paper, we compute the general Randić energy of the line graph of regular graph and the graph obtained by duplication of graph elements for regular graph. We also investigate general Randić equienergetic graphs.

**Keywords and Phrases:** General Randić matrix, General Randić eigenvalues, General Randić energy, General Randić equienergetic graphs.

**2020 Mathematics Subject Classification:** 05C50, 05C76.

## 1. Introduction

We begin with a simple connected graph $G$ with the vertex set $V(G)$ and the edge set $E(G)$. Let $d_i$ be the degree of a vertex $v_i$, for $i = 1, 2, ..., n$. The adjacency matrix $A(G) = [a_{ij}]$ of a graph $G$ is a square matrix of order $n$, where

$$a_{ij} = \begin{cases} 1 & ; \text{ if vertices } v_i \text{ and } v_j \text{ are adjacent} \\ 0 & ; \text{ otherwise} \end{cases}$$

Let $\lambda_1, \lambda_2, ..., \lambda_n$ are eigenvalues of $A(G)$, then they all real numbers with their sum is zero as $A(G)$ is a symmetric matrix. The set of eigenvalues with their