

**GENERALIZED ECCENTRICITY  $k^{th}$  POWER PRODUCT  
ENERGY OF GRAPHS**

**B. Fathima**

Department of Mathematics,  
J. B. A. S. College for Women,  
Teynampet, Chennai - 600018, Tamil Nadu, INDIA

E-mail : fathimasugal82@gmail.com

(Received: Apr. 20, 2022 Accepted: Jun. 02, 2022 Published: Jun. 30, 2022)

**Special Issue**

**Proceedings of International Virtual Conference on  
“Recent Trends in Applied Mathematics, ICRTAM - 2022”**

**Abstract:** Let  $G$  be an undirected, finite and simple graph with  $m$  points and  $n$  lines. For any integer  $1 \leq k < \infty$ , generalized eccentricity  $k^{th}$  power product matrix of  $G$  is a  $m \times m$  matrix with  $(r,s)^{th}$  entry as  $(e_r^k \cdot e_s^k)$  if  $r$  is not equal to  $s$  and zero or else, where  $e_r$  is the eccentricity of the  $r^{th}$  vertex of  $G$ . In this paper, the new energy of graph under the name as generalized eccentricity  $k^{th}$  power product energy of a graph  $G$  ( $EGE^kP(G)$ ) has been introduced. Also we obtain bounds for the generalized eccentricity  $k^{th}$  power product eigenvalues and generalized eccentricity  $k^{th}$  power sum energy of a graph  $G$  ( $EGE^kP(G)$ ).  $GE^kP(G)$  energies of some standard graphs have been attained.

**Keywords and Phrases:** Eccentricity, generalized eccentricity  $k^{th}$  power product matrix, generalized eccentricity  $k^{th}$  power product polynomial, eigenvalues and generalized eccentricity  $k^{th}$  power product energy.

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

## 1. Introduction

Huckel theory proposed a concept on energy in a graph which deals with conjugated carbon molecule.  $\pi$ - electron energy which is evaluated, whose value coincides with the energy of a graph. In discrete structures, adjacency matrix has many