

ENERGY AND LAPLACIAN ENERGY ON INVERSE FUZZY GRAPH

R. Keerthana and S. Venkatesh*

Department of Mathematics,
Saveetha Engineering College,
Thandalam, Chennai - 602105, INDIA

E-mail : keerthanar@saveetha.ac.in

*Department of Mathematics
Srinivasa Ramanujan Centre,
SASTRA(Deemed University), Kumbakonam, INDIA

E-mail : venkatesh.s@src.sastra.edu

(**Received:** Dec. 30, 2025 **Accepted:** Apr. 04, 2026 **Published:** Apr. 30, 2026)

Abstract: Real-time problems involving uncertain or indeterminate information can be effectively addressed using fuzzy graphs (FGs). However, the problems in which the edge membership values have a significant impact due to the combination of its corresponding vertices remain unsolved. To address this, inverse fuzzy graph (IFG) was introduced. In this article, the energy (E^I) and the Laplacian energy (LE) on inverse fuzzy graph (IFG) G^I have been newly introduced. Further, various lower and upper bounds are derived for $E^I(G^I)$ and $LE(G^I)$. Additionally the sharp bound is estimated for $E^I(G^I)$ which aids in determining the minimum and maximum bounds for $E^I(G^I)$. Furthermore, for the newly defined l - regular IFG, the equality condition $E^I(G^I) = LE(G^I)$ holds true.

Keywords and Phrases: Inverse fuzzy graph; l - Regular Inverse fuzzy graph; Energy; Laplacian Energy.

2020 Mathematics Subject Classification: 05C72.

1. Introduction

Real-time problems possessing ambiguous information employ Fuzzy graph (FG) theory introduced by Rosenfeld [21]. Due to its efficient approach towards