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BOUNDS ESTIMATION FOR MINIMUM DEGREE ENERGY

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Abstract. The sum of the absolute values of all minimum degree eigenvalues $E_{md}(\mathfrak{A})$ of a graph $\mathfrak{A}$ is called as the Minimum degree energy of $\mathfrak{A}$. A few upper and lower constraints on the minimum degree energy are obtained in this study.

Keywords. Matrix, Energy, Minimum degree matrix, minimum degree eigenvalues, minimum degree energy.

AMS (MOS) subject classification: 05C50.

1 Introduction

If ν_k, $k = 1, 2, 3, \cdots, n$, are the eigenvalues(characteristic roots) of the AM of a graph $\mathfrak{A}$, then the energy of $\mathfrak{A}$, denoted by $\mathcal{E}(\mathfrak{A})$, is defined as

$$\mathcal{E}(\mathfrak{A}) := \sum_{k=1}^{n} |\nu_k|.$$

Ivan Gutman [5], introduced this idea of graph energy in 1978. German researcher Erich Huckle, employed the energy of graphs technique in the early 1930s to develop approximations for solutions for a family of organic molecules known as conjugated hydro carbons [8], commonly known as Huckle molecular orbital (HMO) theory, for the first time. Thousands of studies have been published since the beginning of graph energy [2, 14, 15, 16, 20]. Numerous matrix types, including, Maximum degree energy [1], Incidence [17], Distance [9], Lapalcian [6], Partition Laplacian Energy of a Graph [10], Minimum Covering Randic energy of a graph [11], Sum-Connectivity Energy of Graphs [12], Randic type Additive connectivity Energy of a Graph [13] and others are established and researched for graphs, with inspiration drawn from the adjacency matrix (AM) of a graph.

Let $\mathfrak{A}$, be a simple graph with vertex set $V(\mathfrak{A}) = \{v_i \mid 1 \leq i \leq n\}$ and edge set $E(\mathfrak{A}) = \{e_i \mid 1 \leq i \leq n\}$. The following kind of matrix, known as the Minimum Degree Matrix(MDM) of $\mathfrak{A}$, was introduced by C. S. Shivakumar