On Weighted Eccentric Connectivity Index of a Graph

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Let $G$ be a connected edge-weighted graph of order $n$ and size $m$. Let $w : E(G) \to N$ be the weighting function. We assume that $w$ is normalized. That is: $\sum_{e \in E(G)} w(e) = m$. The distance $d_w$ between any two vertices in $G$ is the least weight between the two vertices and the eccentricity $e(v)$ of a vertex $v$ in $G$ is the distance from $v$ to a vertex farthest from it in $G$. The edge-weighted eccentric connectivity index is defined as $\xi_w(G) = \sum_{v \in V(G)} \deg(v) e(v)$. We present an exact lower bound for $\xi_w$ in terms of $n$ and show that this bound is sharp. A sharp upper bound in terms of $m$ is also derived. In addition, we present bounds relating $\xi_w(G)$ and $\xi_w(\bar{G})$.

Keywords: order, normalized weight, size, edge-weighted eccentric connectivity index, eccentricity, diameter.