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Linear Operators that Preserve the Edgesum of a Graph

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ABSTRACT

Let $\mathfrak{G}_n$ be the set of all simple (undirected) graphs with a fixed vertex set $V = \{v_1, v_2, \ldots, v_n\}$. A mapping $T : \mathfrak{G}_n \to \mathfrak{G}_n$ is a linear operator if T is closed under the union of graphs and T sends the null graph to itself. The edgesum of a graph $G \in \mathfrak{G}_n$ is the minimum of all the sums $\sum_{uv \in E(G)} |f(u) - f(v)|$, where the minimum is taken over all numberings $f : V \to \{1, 2, \ldots, n\}$. In this paper, we characterize all linear operators of $\mathfrak{G}_n$ that preserve the edgesum.

KEYWORDS: linear operators, edgesum of a graph