Preservation of the $\mathbb{Z}_k$-antimagic Property of a Graph under Edge Addition

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Let $G = (V(G), E(G))$ be a simple graph. Then, G is $\mathbb{Z}_k$-*antimagic* if there exists an edge labeling $f : E(G) \to \mathbb{Z}_k \backslash \{0\}$ such that the induced vertex labeling $f^+ : V(G) \to \mathbb{Z}_k$ (where $f^+(v) = \sum_{uv \in E(G)} f(uv)$, (mod k)) is injective. The *integer-antimagic spectrum* of G is the set $\mathrm{IAM}(G) = \{k : G \text{ is } \mathbb{Z}_k\text{-antimagic and } k \geq 2\}$. We prove that $\mathrm{IAM}(G) \subseteq \mathrm{IAM}(G^*)$, where G^* is any graph obtained by adding simple edges to G. Furthermore, if G is disconnected and the added edges do not create a new K_3-component in G^*, then $\mathrm{IAM}(G) \subseteq \mathrm{IAM}(G^*)$.

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