2-Rainbow Independent Domination in Complementary Prisms

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A function f that assigns values from the set $\{0, 1, 2\}$ to each vertex of a graph G is called a 2-rainbow independent dominating function, if the vertices assigned the value 1 form an independent set, the vertices assigned the value 2 form another independent set, and every vertex to which 0 is assigned has at least one neighbor in each of the mentioned independent sets. The weight of this function is the total number of vertices assigned nonzero values. The 2-rainbow independent domination number of G, $\gamma_{\mathrm{ri2}}(G)$, is the minimum weight of such a function.

We study the 2-rainbow independent domination number of the complementary prism $G\overline{G}$ of a graph G, which is constructed by taking G and its complement $\overline{G}$, and then adding edges between corresponding vertices. We provide tight bounds for $\gamma_{\mathrm{ri2}}(G\overline{G})$, and characterize graphs for which the lower bound, i.e. $\max\{\gamma_{\mathrm{ri2}}(G), \gamma_{\mathrm{ri2}}(\overline{G})\} + 1$, is attained.

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