Friendly Index Sets of n-galaxies

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Let G be a graph with vertex set $V(G)$ and edge set $E(G)$. A vertex labeling $f : V(G) \to \mathbb{Z}_2$ induces an edge labeling $f^* : E(G) \to \mathbb{Z}_2$ defined by $f^*(xy) = f(x) + f(y)$, for each edge $xy \in E(G)$. For $i \in \mathbb{Z}_2$, let $v_f(i) = |\{v \in V(G) : f(v) = i\}|$ and $e_f(i) = |\{e \in E(G) : f^*(e) = i\}|$. We say that f is *friendly* if $|v_f(1) - v_f(0)| \le 1$. The *friendly index set* of G, denoted by $\mathrm{FI}(G)$, is defined as $\mathrm{FI}(G) = \{|e_f(1) - e_f(0)| : \text{vertex labeling } f \text{ is friendly}\}$. An n-*galaxy* is a disjoint union of n stars. In this paper, we establish the friendly index sets for various classes of n-galaxies.

Key words: friendly labeling, friendly index set, graph labeling.