A characterization of trees with equal 2-domination and 2-independence numbers

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A set S of vertices in a graph G is a 2-dominating set if every vertex of G not in S is adjacent to at least two vertices in S, and S is a 2-independent set if every vertex in S is adjacent to at most one vertex of S. The 2-domination number $\gamma_2(G)$ is the minimum cardinality of a 2-dominating set in G, and the 2-independence number $\alpha_2(G)$ is the maximum cardinality of a 2-independent set in G. Chellali and Meddah [*Trees with equal 2-domination and 2-independence numbers,* Discussiones Mathematicae Graph Theory **32** (2012), 263–270] provided a constructive characterization of trees with equal 2-domination and 2-independence numbers. Their characterization is in terms of global properties of a tree, and involves properties of minimum 2-dominating and maximum 2-independent sets in the tree at each stage of the construction. We provide a constructive characterization that relies only on local properties of the tree at each stage of the construction.