On the Zeros of Domination Polynomials

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Let G be a simple graph of order n. The domination polynomial of G is the polynomial $D(G,x)=\sum_{i=1}^{n} d(G,i)x^i$, where $d(G,i)$ is the number of dominating sets of G of size i. A root of $D(G,x)$ is called a *domination root* of G. We denote the set of distinct domination roots by $Z(D(G,x))$. In this paper, we obtain the domination roots of certain graphs, and discuss the location of domination zeros of the families of paths and cycles. We show that if a graph G has two distinct domination roots, then $Z(D(G,x))=\Big\{-2,0\Big\}$. Also, if G is a graph with no pendant vertex and has three distinct domination roots, then $Z(D(G,x))\subseteq\Big\{0,-2\pm\sqrt{2}i,\frac{-3\pm\sqrt{3}i}{2}\Big\}$.

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