On the Zeros of Domination Polynomials

Saeid Alikhani
Yazd University
Iran

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 $Z(D(G, x)) = \{-2, 0\}$. Also, if $G$ is a graph with no pendant vertex and has three distinct domination roots, then $Z(D(G, x)) \subseteq \{0, -2 \pm \sqrt{2}i, \frac{-3\pm\sqrt{3}i}{2}\}$.

Joint work with S. Akbari and Y. H. Peng.