On the multiplicity of A_α-eigenvalues for $\mathbb{T}$-gain graphs

Abstract

Let $\Phi = (G, \varphi)$ be a connected complex unit gain graph ($\mathbb{T}$-gain graph) of n vertices with maximum vertex degree Δ. The associated adjacency matrix and degree matrix are denoted by $A(\Phi)$ and $D(\Phi)$, respectively. Let $m_\alpha(\Phi, \lambda)$ be the multiplicity of λ as an eigenvalue of $A_\alpha(\Phi) := \alpha D(\Phi) + (1-\alpha)A(\Phi)$, for $\alpha \in [0, 1)$. Many upper bounds of nullity in terms of n and Δ are known for undirected graphs and $\mathbb{T}$-gain graphs. In a more general setting, we establish similar bound for $m_\alpha(\Phi, \lambda)$. Some consequences of this bound extend, simplifies and improves the corresponding known bounds. This is a joint work with Dr. M. Rajesh Kannan.