

Strongly regular graphs and domination constraints: an algebraic approach

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Abstract

The spectrum of a graph is the spectrum of its adjacency matrix. A subset of the vertex set of a graph G , is a (k, τ) -regular set if it induces a k -regular subgraph of G and every vertex not in the subset has τ neighbors in it.

The existence of (k, τ) -regular sets associated with all distinct eigenvalues of a graph have been studied; these graphs are necessarily integral (all eigenvalues are integer numbers) and regular (all vertices have the same degree). We show some well known classes of connected integral graphs with this property [1]. But, although triangle free strongly regular graphs is one of that classes not all strongly regular graph verify it. We use the minimal idempotents of the Bose-Mesner algebra of strongly regular graphs to obtain a necessary and sufficient condition of the existence of (k, τ) -regular sets for its two restricted eigenvalues.

Keywords

Graph spectra, Strongly regular graphs, Bose-Mesner algebra.

References

- [1] Carvalho, P. and P. Rama (2010). Integral graphs and (k, τ) -regular sets. *Linear Algebra Appl.* 432, 2409–2417.