Integral Regular Split Multigraphs

Elizabeth Newman, Bianca Reilly, John T. Saccoman*, Seton Hall University

A split graph is a graph in which the nodes can be partitioned into a clique and an independent set (whose nodes are called cones). A split graph G is proper if every cone has the same degree. Past results in spectral graph theory address multigraph concerns in cases which are underlying threshold, whose neighborhoods are nested in a multiset way and all multiple edges are confined to the clique. We present formulas for the eigenvalues of regular split multigraphs in which all multiple edges occur betweeen the clique nodes and cone nodes, multiplicity of multiple edges $\mu > 1$ fixed, and whose adjacency matrix eigenvalues are integral.

Keywords: split graphs, regular graphs, integer eigenvalues, Adjacency matrix, multigraphs