Underlying Split Multigraphs

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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. We have defined an $x$-Ideal Proper Split Graphs, $x - IPS(c; d; b)$, as split graphs with $c$ cones, each of degree $d$, having an $x$-grouping of cone nodes adjacent to the same $d$ clique nodes, and $b$ clique nodes not adjacent to any cones, and presented formulas for Laplacian Eigenvalues for infinite families of these graphs (i.e., On a class of non-Threshold Laplacian Integral Split Graphs, [Fuller and Saccoman, Congressus Numerantium Vol. 220 (2014), pp. 5-16]). We present a formula for the Laplacian eigenvalues of a constructed family of multigraphs whose underlying graph is $x$-Ideal Proper Split and whose clique has all edges of the same multiplicity $\mu > 1$.

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