

Maximal and Extremal Singular Graphs

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A graph G is singular of nullity η if the nullspace of its adjacency matrix \mathbf{G} has dimension η . Such a graph contains η cores determined by a basis, with minimum support sum, for the nullspace of \mathbf{G} . These are induced subgraphs of singular configurations, the latter occurring as induced subgraphs of nullity one of G . Singular configurations may be considered as the ‘atoms’ of a singular graph. We show that there exists a set of η distinct vertices representing the singular configurations. We also explore how the nullity controls the size of the singular substructures and show that the graphs of maximal nullity contain a substructure reaching maximal size.