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Coalesced and embedded nut graphs in singular graphs. (English) Zbl 1168.05330
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Summary: A nut graph has a non-invertible (singular) 0–1 adjacency matrix with non-zero entries in every kernel eigenvector. We investigate how the concept of nut graphs emerges as an underlying theme in the theory of singular graphs. It is known that minimal configurations (MCs) are necessarily found as subgraphs of singular graphs. We construct MCs having nut graphs as subgraphs. Nut graphs can be coalesced with singular graphs at particular vertices or grown into a family of core graphs of larger nullity by adding a vertex at a time. Moreover, we propose a construction of nut line graph of trees by coalescence and a local enlargement of nut fullerenes and tetravalent nut graphs.

MSC:

05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)

05B20 Combinatorial aspects of matrices (incidence, Hadamard, etc.)

92E10 Molecular structure (graph-theoretic methods, methods of differential topology, etc.)

Cited in 4 Documents

Keywords:

adjacency matrix; nut graph; kernel eigenvector; singular graphs; core; periphery; nut fullerenes; line graphs of trees

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