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Matrix partitions of split graphs. (English) [Zbl 1283.05213]

Summary: Matrix partition problems generalize a number of natural graph partition problems, and have been studied for several standard graph classes. We prove that each matrix partition problem has only finitely many minimal obstructions for split graphs. Previously such a result was only known for the class of cographs. (In particular, there are matrix partition problems which have infinitely many minimal chordal obstructions.) We provide (close) upper and lower bounds on the maximum size of a minimal split obstruction. This shows for the first time that some matrices have exponential-sized minimal obstructions of any kind (not necessarily split graphs). We also discuss matrix partitions for bipartite and co-bipartite graphs.

MSC:
05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
05C15 Coloring of graphs and hypergraphs
05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)

Keywords:
generalized graph colouring; matrix partition; split graphs; minimal obstructions; forbidden subgraphs

Full Text: DOI arXiv

References:

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