

## **SDP and eigenvalue bounds for the graph partition problem**

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The graph partition problem is the problem of partitioning the vertex set of a graph into a fixed number of sets of given sizes such that the total weight of edges joining different sets is optimized. In this talk we show how to simplify a known matrix-lifting SDP relaxation of the graph partition problem for several classes of graphs and also show how to aggregate additional triangle and independent set constraints for graphs with symmetry.

Further, we present an eigenvalue bound for the graph partition problem that is the first known closed form bound that is applicable to any graph and partition, thereby extending a well-known result in spectral graph theory. Finally, we compare resulted bounds with vector-lifting SDP bounds for the graph partition problem.