

# An Extended Formulation Approach to the Edge-weighted Maximal Clique Problem

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## ABSTRACT

Given an edge-weighted complete graph and an integer  $b$ , we consider the problem of finding a clique of size less than or equal to  $b$  with maximum edge weight. We propose an optimization algorithm to the problem using an extended formulation using node and edge variables. We show that the formulation gives much stronger LP relaxation than the natural formulation using only the edge variables. By using the projection technique, we also derive new classes of facet-defining inequalities for the lower dimensional polytope of edge variables. Computational results show that the approach can solve larger problem instances optimally than that using the natural formulation.