

# Subgraph Complementation

## Abstract

A *subgraph complement* of the graph  $G$  is a graph obtained from  $G$  by complementing all the edges in one of its induced subgraphs. We study the following algorithmic question: for a given graph  $G$  and graph class  $\mathcal{G}$ , is there a subgraph complement of  $G$  which is in  $\mathcal{G}$ ? We show that this problem can be solved in polynomial time for various choices of the graphs class  $\mathcal{G}$ , such as bipartite,  $d$ -degenerate, or cographs. We complement these results by proving that the problem is NP-complete when  $\mathcal{G}$  is the class of regular graphs.