

Abstract

We show that solving linear programming (LP) relaxations of many classical NP-hard combinatorial optimization problems is as hard as solving the general LP problem. Precisely, the general LP can be reduced in linear time to the LP relaxation of each of these problems. This result poses a fundamental limitation for designing efficient algorithms to solve the LP relaxations, because finding such an algorithm might improve the complexity of best known algorithms for the general LP. Besides linear-time reductions, we show that the LP relaxations of the considered problems are P-complete under log-space reduction, therefore also hard to parallelize.