

LP Alchemy for the Stability Number of a Graph

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Abstract

The stability number of a graph is the cardinality of a maximum set of non-adjacent vertices. We will discuss linear programming (LP) techniques for the exact calculation of the stability number. The LP alchemy (or magic) is that local conditions can sometimes give efficient global results. Useful cutting planes for the corresponding integer program (IP) are given by clique and odd-hole constraints. An alpha-critical graph is one where the removal of any edge increases the independence number of the graph; these include cliques and odd-holes. Many other alpha-critical graphs exist besides cliques and odd-holes. We discuss experiments with a variety of alpha-critical graph constraints, and present new theoretical results. – This is joint work with Paul Brooks.

Keywords: graph, stability number, linear program, integer program.