LP and SDP relaxations

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Introduction

1. Lovász, Schrijver: *Cones of matrices and set-functions and* $0-1$ *optimization*
   - Definition and basic properties of LS and LS_+ hierarchies
   - Application to the stable set problem
   - Interpretation via set functions
2. Laurent: *A Comparison of the Sherali-Adams, Lovász-Schrijver and Lasserre Relaxations for 0-1 Programming*
   - Focus on sections 3, 4, 5, 6.1
   - Definition and basic properties of SA and Las hierarchies
   - Relationships between hierarchies
   - Application to the stable set problem

Positive results (1)

1. Karlin, Mathieu, Nguyen: *Integrality Gaps of Linear and Semi-definite Programming Relaxations for Knapsack*
2. Chlamtac, Friggstad, Georgiou: *Understanding set cover: Sub-exponential time approximations and lift-and-project methods*
3. Rothvoß: *Directed Steiner Tree and the Lasserre Hierarchy*
4. Cygan, Grandoni, Mastrolilli: *How to Sell Hyperedges: The Hypermatching Assignment Problem*
5. Mathieu, Sinclair: *Sherali-Adams Relaxations of the Matching Polytope*

Negative results

1. Charikar, Makarychev, Makarychev: *Integrality Gaps for Sherali-Adams Relaxations*
2. Schoenebeck: *Linear Level Lasserre Lower Bounds for Certain k-CSPs*
3. Chan, Lee, Raghavendra, Steurer: *Approximate Constraint Satisfaction Requires Large LP Relaxations*

Positive results (2)

1. Chlamtac: *Approximation Algorithms using hierarchies of semidefinite programming relaxations*
   (coloring of 3-colorable graphs)
2. Barak, Raghavendra, Steurer: *Rounding semidefinite programming hierarchies via global correlation*
   (unique games and other constraint satisfaction problems)

Additional survey-type literature

- Chlamtac, Tulsiani: *Convex Relaxations and Integrality Gaps*
- Rothvoß: *The Lasserre hierarchy in approximation algorithms*