

Fourth Homework Assignment for Math 408 and 827

Due: Wednesday, March 21st, 2007, in class.

Problems for Math 408 and 827:

1. Chapter 8 problem 8.
- 2.-3. Chapter 9 problems 1 and 3.
4. Show that the system $\{x, y \in \mathbb{R}^2 \mid x + y \leq 0, x - y \leq 0\}$ is not TDI, but that if we add the redundant inequality $x \leq 0$, the system becomes TDI.
5. What is the dimension of the convex hull of the set of permutations matrices considered as points in \mathbb{R}^{n^2} ?

Additional problems for Math 827:

- 6.-7. Chapter 9 problems 4 and 14.
8. Consider the stable set formulation from Chapter 9, problem 14. Take the graph G which consists of a 5-cycle and a single vertex v_6 attached to each vertex of the cycle. (Such graphs are sometimes called *wheels*. Some years ago the 5-wheel also appeared as a crest on Chryslers). The 5-cycle inequality is valid for the 5-wheel.
 - (1) What is the dimension of the face induced by the 5-cycle inequality? What is the dimension of the stable-set polytope of the 5-wheel?
 - (2) Lift this face to a facet by adding a term representing the variable x_6 to the inequality.

Reading:

Chapters 10 and 11.

Schedule of Presentations. Please verify if the schedule is correct and let me know ASAP if there are any errors:

Graduate students have the option of presenting their talk either in class, on their selected Friday, or on the following Monday in the Operation Research Seminar (3:30, room SUR 14-400) or both. The OR Seminar will include audience members from the SFU community.

Monday, March 19th: Karel Casteels.

Michel X. Goemans and David P. Williamson, *Improved approximation algorithms for maximum cut and satisfiability problems using semidefinite programming*, J. Assoc. Comput. Mach. **42** (1995), no. 6, 1115–1145.

Monday, March 26th: Arman Kaveh.

Sanjeev Arora, *Polynomial time approximation schemes for Euclidean traveling salesman and other geometric problems*, J. Assoc. Comput. Mach. **45** (1998), no. 5, 753–782.

Monday, April 2nd: Annie Zhang.

Dimitris Bertsimas and Melvyn Sim, *Robust discrete optimization and network flows*, Math. Program., **98**, (2003), no. 1-3, Ser. B, 49–71.

Also note that Dan Benvenuti's thesis M.Sc. defense will be on Friday, March 30th at 9:30 a.m. in Surrey 14-400.