First Homework Assignment for Math 448 and 748

Due: Friday, January 22nd.

All section references are to the text.

Problems to hand in for Math 448 and 748:

Chapter 1, exercises 1.2, 1.4.
Chapter 2, exercises 2.20, 2.24, 2.44.
Chapter 3, exercises 3.6, 3.10.
Chapter 4, exercise 4.2.

Additional problems to hand in for Math 748:

Chapter 1, exercise 1.7.
Chapter 4, exercise 4.34.

Math 448 students are also welcome to try these problems.

Some other problems you might try:

The textbook offers a large supply of good problems, many of them not too difficult. The formulation problems in Chapter 1 are nice, you should make sure you have an idea how to solve them. Chapter 2 is a review of graph theory in the context of network flows. If you have not studied graph theory (Math 342 or equivalent), trying these problems will help. Similarly, Chapter 3 is a review the CS material we need, if you haven't taken CMPT 225 or a similar course, solving these problems will help.

Reading for this week:

If you haven't already, please read Chapters 1 and 2.
For Friday, January 15th, Sections 3.1–3.3.
For Wednesday, January 20th, Sections 3.4–3.6 and Sections 4.1-4.4.
For Friday, January 22nd, Sections 4.5-4.6.

Presentations:

Math 748 students will give presentations of recent research papers in class or in the Operations Research Seminar. These presentations will take place from April 9th to 16th. The presentation will be 50 minutes, auditing students are invited to give ungraded 25 minute presentations. Please sign-up for a date and time on a first-come, first-served.

Please also choose a paper. I would like to finalize the choices by Friday, February 5th. The ideal situation would be to choose papers that are relevant to your own research. If you have, or are considering, an advisor, I recommend consulting with them.

Examples of some suitable papers are on the back of this page, but I am quite flexible on what you present.

References

[Ald08] David J. Aldous, *Cost-volume relationship for flows through a disordered network*, Math. Oper. Res. **33** (2008), no. 4, 769–786.

[FS07] Lisa Fleischer and Martin Skutella, *Quickest flows over time*, SIAM J. Comput. **36** (2007), no. 6, 1600–1630 (electronic).

[GK07] Naveen Garg and Jochen Könemann, *Faster and simpler algorithms for multicommodity flow and other fractional packing problems*, SIAM J. Comput. **37** (2007), no. 2, 630–652 (electronic).

[Gue01] Bertrand Guenin, *A characterization of weakly bipartite graphs*, J. Combin. Theory Ser. B **83** (2001), no. 1, 112–168.

[Iwa08] Satoru Iwata, *Submodular function minimization*, Math. Program. **112** (2008), no. 1, Ser. B, 45–64.

[Jai01] Kamal Jain, *A factor 2 approximation algorithm for the generalized Steiner network problem*, Combinatorica **21** (2001), no. 1, 39–60.

[RV93] Mauricio G. C. Resende and Geraldo Veiga, *An implementation of the dual affine scaling algorithm for minimum-cost flow on bipartite uncapacitated networks*, SIAM J. Optim. **3** (1993), no. 3, 516–537.

[Tar85] Éva Tardos, *A strongly polynomial minimum cost circulation algorithm*, Combinatorica **5** (1985), no. 3, 247–255.