MATH 582 B Course Project February 16, Winter 2009

For the course project, you have three options:

Option 1. Write a report on a topic in convex optimization algorithm. It should be related to the course material and have "sufficient" mathematical content at a graduate level. It can involve complexity/convergence analysis and/or implementation. A length of 6-10 pages seems reasonable (excluding figures and references). The report will be evaluated based on clarity, content, and understanding. You might check with me on whether a topic is suitable before proceeding further with it.

Option 2. Write a computer program in a standard programming language (C, C++, Fortran, Basic, Matlab, etc.) to solve the SDP relaxation of the MaxCut problem. You can choose the algorithm. The program should be documented and it will be evaluated based on readability and efficiency. It should run correctly. If possible, configure your program so that it can run on Unix/Linux (since that's the operating system I will use to run it.) Test your program on maxG11 (800 nodes) and maxG51 (1000 nodes), which can be downloaded from `http://infohost.nmt.edu/~sdplib/`. The same webpage posts the optimal objective value. Optional: You can benchmark your program against a public-domain SDP solvers such as Sedumi (get the old version 1.05 by Jos Sturm, which is more stable), SDPT^3, CSDP, DSDP (found by google).

Option 3. Write a computer program in a standard programming language (C, C++, Fortran, Basic, Matlab, etc.) for image denoising by TV (total variation) minimization. (We should cover it in the first week of March.) You can choose the algorithm. The program should be documented and it will be evaluated based on readability and efficiency. It should run correctly. Test your program on the noisy Barabara image posted at the class webpage. The grey-scale image (a png file) can be read by Matlab as a matrix M of pixel values using the command

```
M = imread('Barbara_noisy.png');
```

Please turn in your project by **March 16** noon.