Problem Set #5
IE 417
Due November 22, 2002

Assignment: You will compile a brief survey of the software that is available for solving nonlinear optimization problems. You should consult multiple sources to complete your survey, including journal articles and Web pages. There are a number of Web directories listing available numerical software that should help. As part of your survey, you should locate repositories of standard test problems and use these to perform informal testing of 2-3 of the software packages from your survey. This could be done either by downloading and installing the software locally or by submitting test problems over the Web to a server, such as NEOS. You will submit a written report of our findings, as well as presenting them orally in class on Friday, November 22. Your report should be approximately 5 pages long and your oral presentation should be 15-20 minutes. You should address the following questions.

1. How much software is available and is the software primarily from commercial or academic sources?
2. What is the current state of the art in solving nonlinear programs?
3. What size problems can reasonably be solved?
4. Are nonlinear solvers being used routinely in industry?
5. What are the most popular methods implemented in solvers?
6. What are the standard file formats used for specifying nonlinear problem instances?
7. Are there well-known unsolved problem instances?

For this project, you should divide into three groups of two, attempting to concentrate your testing on different areas of nonlinear optimization. Here are suggested topics for the three groups:

1. Unconstrained optimization (quasi-Newton, etc),
2. Interior-point methods,
3. Other constrained methods.

This may or may not be a good division of labor, so feel free to adjust as needed.