

MA 784, Assignment 3, Due 4/26/11

This is the final assignment. All page numbers refer to the optimization book.

1. Problems 4.5.1, 4.5.7, and 4.5.9 on page 85.
2. Problems 5.8.1, 5.8.2, and 5.8.5 on page 108.
3. Problems 6.4.3 (page 121), 7.7.4 (page 133), and 8.6.7 (page 159).
4. Problems 8.6.1 and 8.6.4 from page 159.
5. Apply BFGS and Nelder-Mead to any problem from your own research. Compare the performance and explain why one was better than the other for your problem.
6. Write an SR-1 quasi-Newton code and use it to solve the discrete control problem from § 1.6.1. Compare the performance to BFGS.
7. Apply new **NEW VERSION** of imfil.m to the discrete control problem for  $h = .25$  and  $h = .1$ . Plot the optimization history with a graph of function value versus the number of function evaluations.
8. Write a coordinate search and a Hooke-Jeeves code. Compare those codes on the examples from problems 8.6.1 and 8.6.4 from page 159.  
**We may not get this far in 2011. Ignore this one if we don't.**
9. Write a simple arclength continuation code and use it to find **both** solutions of the H-equation for  $c = 1/2$ . Plot the two solutions. Plot the curve of  $\|H\|_1$  vs  $c$  at least as far as you went to get the two solutions for  $c = 1/2$ . How far could you proceed with the continuation? What went wrong when you could go no further?