

Homework

There will be three sets of homework. You must do

- at least one problem from each set, and
- at least six problems in total.

It is ok to do the homework in teams of no more than five people. Those of you who plan to get degrees in numerical analysis should do **more than the minimum** six problems.

Approximate Schedule of Topics

- Week 1–2 Nonlinear equations/optimization in one variable.
Week 2–3 Review of advanced calculus and numerical linear algebra.
Week 3–6 Newton’s method and variations in several variables. Newton Iterative Methods.
Weeks 6–7 Broyden’s method, proof of superlinear convergence.
Week 9 Unconstrained Optimization, Newton’s method for unconstrained optimization.
Week 10–11 Globally convergent variations of Newton’s method.
Week 11–12 Nonlinear least squares, Quasi-Newton methods for unconstrained optimization.
Weeks 13–14 Student presentations.

Things for you to do.

1. Learn \LaTeX (or some other technical wordprocessing program) and MATLAB if you have not already done so. An old version of the MATLAB Primer [11] is available on the course web page. The book by Higham and Higham (see reference list) is also very good. There is considerable help with MATLAB and \LaTeX on the course web page.
2. Start thinking about your presentation. I’d like it to be related to your own research interests. Those of you who are not math majors are welcome to prepare something on nonlinear equations/optimization problems in your thesis work. If you have an idea for a presentation, come talk to me about it.

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