

MA 784, Nonlinear Equations and Optimization
Spring 2019
C. T. Kelley, instructor

Books: Free downloads from library

- C. T. KELLEY, *Iterative Methods for Linear and Nonlinear Equations*, number 16 in *Frontiers in Applied Mathematics*, SIAM, Philadelphia, 1995.
- C. T. KELLEY, *Iterative Methods for Optimization*, number 18 in *Frontiers in Applied Mathematics*, SIAM, Philadelphia, 1999.

Schedule:

- Nonlinear equations/optimization in one variable.(1 weeks)
- Review of advanced calculus and numerical linear algebra.(1weeks)
- Newton's method and variations in several variables. Newton Iterative Methods. (2.5 weeks)
- Broyden's method, other quasi-Newton methods (.5 weeks)
- Unconstrained Optimization, Newton's method for unconstrained optimization. (1 week)
- Globally convergent variations of Newton's method. (2 weeks)
- Pseudo-Transient continuation. (1 week)
- Nonlinear least squares, Quasi-Newton methods for unconstrained optimization. (1 week)
- Continuation Methods (1 week)
- Sampling methods for noisy problems (1 week)
- Student presentations. (2 weeks)