

Stat 310, Part II, Optimization. Homework 3.

1. (Problem 8.3 Nocedal and Wright). Verify formula (8.21) for approximating an element of the Hessian using only function values.
2. (Problem 4.8 Nocedal and Wright). Show that (4.43) and (4.44) are equivalent.
3. (Problem 4.5 Nocedal and Wright). Show that τ_k defined by (4.12) does indeed identify the minimizer of m_k along the direction $-g_k$
4. Download and install the automatic differentiation package INTVAL. Implement the derivatives of the fenton function using (1) INTVAL and (2) Finite Difference Approximations. Run the algorithm from the previous homework with both ways of computing the derivatives, and state your conclusions, particularly insofar rate of convergence.
 - a. NOTE: Link to INTVAL is on my web page in course outline. Example how to run intval can be found in my fenton_wrapper.m function on my website, near Homework 1.
5. Propose a trust-region algorithm where the trust-region subproblem is solved using computing the eigenvalues of B^k (using Matlab's "eig" function). This should be based on equations (4.39) for the "easy" case and (4.45) for the "hard" case. Implement the algorithm and run it for Fenton's function.