

# HW 4

Optimization Methods Fall 2001

October 5, 2011

1. Search for a minimum of a function

$$f(x) = (x_1 - x_2)^2 + (1 - x_1)^2 + x_2x_3 + 3x_3^4, \quad x_0 = [0, 1, 1]$$

by

- a) Conjugate gradient method (any variant),
- b) Quasi-Newton method (any variant).

Show the history of iterations, compare.

2. 5.8

Assume  $n=8$ , matrices are diagonal, eigenvalues are equal to:

- a) 1, 1, 3, 3, 3, 5, 5, 8.
- b) 1, 2, 3, 4, 5, 6, 7, 8.

Starting point  $x_0 = [1, 1, \dots, 1]$ . Show the history of iterations.

3. 5.11

4. 6.2

5. 6.4

6. **6.10 Bonus** Even if you do not prove it, enjoy the formula's elegance!