(7th Assignment is due on May 24th. The paper work must be submitted on the class.)

(1) Please minmize $(x_1 - 2)^4 + (x_1 - 2x_2)^2$ through Newton method and Steepest descent with initial value=(0,3).

(2) Please apply Newton method and Steepest descent and Conjugate Gradient Method on minmize $(x_1 - 2)^2 + (x_1 - 2x_2)^2$.

(3) (i) Assume that $d_1, d_2, ..., d_n$ are $Q_{n \times n}$-conjugate, where Q is positive definite matrix. Please show $d_1, d_2, ..., d_n$ are linearly independent. (ii) For the minimization of $\frac{1}{2}x^t Q x + c^t x$, where Q is a $n \times n$ positive definite matrix. Assume that $x_1, x_2, ..., x_n$ come from conjugate gradient method, can we guarantee that $f_{(x_j)} \geq f(x_{j+1}), \forall j$?