

AEM 685: Homework # 4

Due on 10/16/2015

Important: Please work independently.

Problem 1: Minimize the optimization problem using Augmented Lagrange Multiplier Method (30 Points), Sequential Quadratic Programming (40 Points), and Generalized Reduced Gradient Method (30 Points). You have to write Matlab program. Plot the contour plot and optimization history in the plot.

$$\text{Minimize } f(x_1, x_2): x_1^4 - 2x_1^2x_2 + x_1^2 + x_1x_2^2 - 2x_1 + 4$$

$$\text{Sub to: } h(x_1, x_2): x_1^2 + x_2^2 - 2 = 0$$

$$g(x_1, x_2): 0.25x_1^2 + 0.75x_2^2 - 1 \leq 0$$

$$0 \leq x_1 \leq 4$$

$$0 \leq x_2 \leq 4$$

Start the optimization using $x_1 = 3$ and $x_2 = 2$ as an initial guess for design variables. For the convergence use, norm of the gradient of objective or augmented objective as $1e-04$.