Final Exam : May 29, 2008

노트 제목

Problem # 1: Solve for $A_1, A_2 > 0$

(20 pts)

$$\min_{A_1, A_2} \; f = \frac{2}{\sqrt{3}} A_1 + A_2$$

$$\text{s.t} \quad F\left(\frac{8}{\sqrt{3}A_1} + \frac{3}{A_2}\right) - \sigma_0 \le 0$$

(F: given force, σ: allowable stress, A_i: Area)

problem # 2 Solve the following convex problem by the dual method.

(50 pts)

$$\min_{x_1, x_2} \; f(x_1, x_2) = (x_1 - 3)^2 + (x_2 + 1)^2$$

$$\text{s.t} \quad \begin{cases} x_1 + x_2 - 1.5 \le 0 \\ x_1 \le 1 \end{cases}$$

problem 3. Consider the following nonlinear problem:

(30 pts)

$$\min_{\underset{\sim}{x} \in R^2} \; f(x_1, x_2) = x_1^2 + x_2^2$$

$$\text{s.t} \quad (x_1 - 1)^3 - x_2^2 \ge 0$$

a) Write down KKT condition.

b) Find the optimal solution.

problem 4 : Prove $SS_T = SS_R + SS_E$

(50 pts) where $SS_T = \sum_{i=1}^{n} (y_i - \bar{y})^2$, $SS_R = \sum_{i=1}^{n} (\hat{y}_i - \bar{y}_i)^2$,

$$SS_E = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2)$$

(Assume ① $y_i = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ij} + \varepsilon_i$, ② β is estimated by the least squre method.

Derive "all" necessary eqs needed for proof.)