

Homework #5 (due November 1, 2012)

1. Let $X_i = A_i\theta + \mathbf{e}_i, i = 1, 2$ where A_i is a known $n_i \times p$ matrix, θ a parameter and \mathbf{e}_i ($n_i \times 1$) a vector of errors with zero mean and covariance matrix $\sigma^2 I_{n_i}$, I_n being the identity $n \times n$ matrix.

Let now

$$A = \begin{bmatrix} A_1 \\ A_2 \end{bmatrix}, X = \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}, \mathbf{e} = \begin{bmatrix} \mathbf{e}_1 \\ \mathbf{e}_2 \end{bmatrix}$$

so that A is an $(n_1 + n_2) \times p$ matrix and X and \mathbf{e} are $(n_1 + n_2) \times 1$ vectors. Show that the LSE of θ from X is a linear combination of the LSE's from X_1 and X_2 .

2. Find the conjugate family of priors for the family of pdf's

$$f(x|\theta) = (1/\theta), \theta < x < 2\theta$$

with $\theta > 0$ as a parameter.

3. Chapter 4: Problems 1, 2.