

MTH 207M

Quiz 3

Roll No:

Time: 10 AM to 10:50 AM

Name:

Problem 1: Consider the following model

$$E(y_{ij}) = \mu + \alpha_i; \quad i = 1, \dots, k, \text{ and } j = 1, \dots, n. \quad (1)$$

Find an unrestricted estimator of $\theta = (\mu, \alpha_1, \dots, \alpha_k)^T$ minimizing the residual sum of squares. (3 Marks)

Problem 2: Find a restricted estimator of $\theta = (\mu, \alpha_1, \dots, \alpha_k)^T$ minimizing the residual sum of squares with restriction $\sum_{i=1}^k \alpha_i = 0$. (3 Marks)

Problem 3: Find the variance of $\hat{\alpha}_i$, where $\hat{\alpha}_i$ is the restricted estimator of α_i . (2 Marks)

Problem 4: Find the covariance of $\hat{\alpha}_i$ and $\hat{\alpha}_j$. (2 Marks)