

MAI0142
Hand in Problems – 7

1. Show that $\widehat{E(\mathbf{X})} = \mathbf{A}_1 \widehat{\mathbf{B}}_1 \mathbf{C}_1 + \mathbf{A}_2 \widehat{\mathbf{B}}_2 \mathbf{C}_2$ is an unbiased estimator of $E(\mathbf{X})$.
2. Show that the models

$$(I) \quad \mathbf{X} \sim N_{p,n} \left(\sum_{i=1}^3 \mathbf{A}_i \mathbf{B}_i \mathbf{C}_i, \boldsymbol{\Sigma}, \mathbf{I} \right), \quad \mathcal{C}(\mathbf{C}'_3) \subseteq \mathcal{C}(\mathbf{C}'_2) \subseteq \mathcal{C}(\mathbf{C}'_1)$$

and

$$(II) \quad \mathbf{X} \sim N_{p,n} \left(\sum_{i=1}^3 \mathbf{A}_i \mathbf{B}_i \mathbf{C}_i, \boldsymbol{\Sigma}, \mathbf{I} \right), \quad \mathcal{C}(\mathbf{A}_3) \subseteq \mathcal{C}(\mathbf{A}_2) \subseteq \mathcal{C}(\mathbf{A}_1)$$

are equivalent.