

MAI0142
Hand in Problems – 3

1. In the general univariate linear model $\mathbf{x}' = \beta\mathbf{C} + \mathbf{e}'$, specify \mathbf{C} in the following two cases:
 - (i) A multiple regression model with two independent variables and 10 observations.
 - (ii) A two-way ANOVA with interactions which is supposed to be balanced and all parameters are estimable.
2. Let \mathbf{A} and \mathbf{B} be two matrices of proper sizes. Show that $\mathcal{C}(\mathbf{A}) \cap \mathcal{C}(\mathbf{B}) = \mathcal{C}(\mathbf{A}(\mathbf{A}'\mathbf{B}^o)^o)$.
3. Let \mathbf{A} and \mathbf{B} be two matrices of proper sizes. Show that $\text{rank}(\mathbf{A}\mathbf{B}^o) = \text{rank}(\mathbf{A}' : \mathbf{B}) - \text{rank}(\mathbf{B})$.