

MA329 Statistical linear models 23-24

Assignment 2 (Due date: Oct 20, 11pm. For late submission, each day costs 10 percent)

1. (10 marks) If \mathbf{A} , \mathbf{B} and $\mathbf{A} + \mathbf{PBQ}$ are nonsingular, prove that

$$(\mathbf{A} + \mathbf{PBQ})^{-1} = \mathbf{A}^{-1} - \mathbf{A}^{-1}\mathbf{PB}(\mathbf{B} + \mathbf{BQA}^{-1}\mathbf{PB})^{-1}\mathbf{BQA}^{-1}$$

2. (15 marks) $\mathbf{A} = \begin{pmatrix} 4 & 2 & 2 \\ 2 & 2 & 0 \\ 2 & 0 & 2 \end{pmatrix}$

- (a) Find a symmetric generalized inverse for \mathbf{A} ;
 - (b) Find a nonsymmetric generalized inverse for \mathbf{A} .
3. (15 marks) Prove that $(\mathbf{X}'\mathbf{X})^{-}\mathbf{X}'$ is a generalized inverse of \mathbf{X} for any generalized inverse of $\mathbf{X}'\mathbf{X}$.