

Assignment #2Due Friday 2/6/15 by 6 p.m.

Always explain and show the calculations used to arrive at your answers.

1) consider

$$\mathbf{A} = \begin{bmatrix} 1 & 0 & 1 \\ 2 & 1 & 1 \end{bmatrix}, \quad \mathbf{B} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}, \quad \text{and } \mathbf{C} = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$$

compute  $\mathbf{ABC}$ ,  $\mathbf{CAB}$ ,  $\mathbf{BCA}$ ,  $\mathbf{CB'A'}$ , and  $\mathbf{C'B'A'}$ 2) Show whether or not  $\mathbf{A} = \mathbf{X}(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'$  is idempotent3) Determine whether the quadratic form  $Q = x_1^2 + 2x_2^2 + x_3^2 - 2x_1x_2 + 2x_2x_3$  is positive definite or not

[hint: rewrite in matrix notation and then check the coefficient matrix]

4) show that the simple regression line of  $y$  against  $x$  coincides with the simple regression line of  $x$  against  $y$  if and only if  $r^2 = 1$  (where  $r$  is the sample correlation coefficient between  $x$  and  $y$ ).

Wooldridge pp. 60-61: #1, 6

Wooldridge p. 64: #C2, C3