

Assignment 2

Grading
Fehl

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$$(Q4) \quad y'y = y'y$$

$$y'x\hat{\beta} = y'y$$

$$y'(x'x)^{-1}x'y = y'y$$

$$y'Iy = y'y$$

$$y'y = y'y$$

$$\hat{y} = x\hat{\beta}$$

$$\hat{\beta} = (x'x)^{-1}x'y$$

$$\text{let } x = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}, \text{ let } y = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, y' = [2, 1]$$

$$x(x'x)^{-1}x' = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} \left(\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} \right)^{-1} \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} \begin{bmatrix} 13 & -5 \\ -5 & 2 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & -1 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$$