30 Sheets of notes

Lin Models Final
Likely 6 pages

1) MLE problem like Exam 2 #1, Q4 / HW5 #1

2) Show $A^- : E^{-1}$ a generalized inverse of A so $AA^-A = A$.

Exam 1 #5 Q1 #d

3) Show C is idempotent $C^2 = C$

4) Write terms as $A\underset{\sim}{Y}$, $\underset{\sim}{a}^T\underset{\sim}{Y}$ or $\underset{\sim}{Y}^T A \underset{\sim}{Y}$

ex i) $\bar{Y} = \frac{1}{n}\sum_{i=1}^{n} Y_i = \frac{1}{n}\underset{\sim}{1}^T\underset{\sim}{Y}$

ii) $\sum (Y_i - \hat{Y}_i)^2 = \sum e_i^2 = \underline{Y}'(I-P)\underline{Y}$ SSTO

iii) $\sum \hat{Y}_i^2$ $= \underline{Y}'P\underline{Y}$ SSE

iv) $\hat{\beta}$ $= (X'X)^{-1}X'\underline{Y}$ SSREG

v) $\hat{\underline{Y}}$ $= P\underline{Y}$ don't give

Q10 #1
see Q11 Exam 2

5) $E\,\underline{Y}'A\underline{Y} = \text{tr}A\Sigma + E\underline{Y}'AE\underline{Y}$

Exam 1 66

6) $Cov(A\underset{\sim}{Y}) = A\, Cov(\underset{\sim}{Y})\, A'$

$Cov(\underset{\sim}{x}, \underset{\sim}{y}) = E((\underset{\sim}{x} - E\underset{\sim}{x})(\underset{\sim}{y} - E\underset{\sim}{y})')$ Q3 1e

7) Independence of $A\underset{\sim}{Y}$, $B\underset{\sim}{Y}$, $\underset{\sim}{Y}'C\underset{\sim}{Y}$

$\underset{\sim}{Y}' D \underset{\sim}{Y}$ Craig's theorem

$A\underset{\sim}{Y} \perp\!\!\!\perp B\underset{\sim}{Y} \Rightarrow g(A\underset{\sim}{Y}) \perp\!\!\!\perp h(B\underset{\sim}{Y})$

Exam 1 3, 7 Exam 2 3 Q2 2

8) Given X find $[C(X)]^{\perp}$ = nullspace of X'.

Q1 1c)

9) LS CLT MREG CLT

$\sqrt{n}(\hat{\beta} - \beta) \xrightarrow{D} N_p(0, \sigma^2 W)$

$\sqrt{n}\, vec(\hat{B} - B) \xrightarrow{D} N_{pm}(0, \Sigma_\varepsilon \otimes W)$

See Q1 Exam 2 6, 7 Q4 3, 4

10) MLN calculations

Exam 1 1 Q2 1)

11) Projection matrix

Exam 1 4 Exam 2 4

12) Distribution of quadratic forms Lin models final2

Exam 2 8 Q6 1,3 Q5 1a

13) Estimable functions Q7 3,4 E3 6

14) write model in matrix form or find X

To test $A\beta = 0$ or $L\beta = 0$

find A or L

Q10 1 Q7 1 Exam 3 1

15) MREG what is $\hat{\beta}$ etc Q11

Exam 3 9

16) Bootstrap

Other questions are possible.