MAT 4 / MA

Problems 14

Comments and hints are additional to those given in the book p. 623 - 624.

8.5 When $H_1 : AB \neq C$ is true we have

$$\left.\begin{array}{l} E \sim W_d(n-r, \Sigma) \\ H \sim W_d(q, \Sigma ; \Sigma^{-\frac{1}{2}} D \Sigma^{-\frac{1}{2}}) \end{array}\right\} \text{independent},$$

cf. modified corollary 2 to theorem 2.4.

8.7 a Result : $\hat{B} = \begin{bmatrix} \bar{y}^T \\ (X_2^T X_2)^{-1} X_2^T Y \end{bmatrix} = \begin{bmatrix} \bar{y}^T \\ (X_2^T X_2)^{-1} X_2^T \tilde{Y} \end{bmatrix}$

b Determine H in four ways:

(i) By using "corollary" 1 to theorem 8.5

(ii) By first determining E_H and then $H = E_H - E$

(iii) By first determining $P_{\omega^\perp \cap \Omega}$ and then $H = \tilde{Y} P_{\omega^\perp \cap \Omega} \tilde{Y}$ (check that $\tilde{Y} = Y - XB_0$ with $AB_0 = 0$)

(iv) By first determining P_ω and then $H = \tilde{Y} (P_\Omega - P_\omega) \tilde{Y}$

8.8