**56:295 – 001**
**Multivariate Statistics and Advanced Quality Control**
**Fall 05**

HW2 Due: September 21 (Wednesday), 6:15pm

**Solution**

Solve the following problems from the textbook (J&W)

4.18
The MLE are:
$\hat{\boldsymbol{\mu}} = \bar{\mathbf{x}} = \begin{bmatrix} 4 \\ 6 \end{bmatrix}$, $\hat{\boldsymbol{\Sigma}} = \begin{bmatrix} 0.5 & 0.25 \\ 0.25 & 1.5 \end{bmatrix}$

4.19(a)(b)
(a) $\sim \chi_6^2$

(b) $\bar{X} \sim N_6(\mu, \frac{1}{20}\Sigma)$; $\sqrt{20}(\bar{X} - \mu) \sim N_6(0, \Sigma)$

5.1

(a) $\bar{X} = \begin{bmatrix} 6 \\ 10 \end{bmatrix}; S = \begin{bmatrix} 8 & -10/3 \\ -10/3 & 2 \end{bmatrix}$

$T^2 = 13.64$

(b) $T^2$ has distribution as $3F_{2,2}$

(c) $F_{2,2}(0.05) = 19$ Since $T^2 = 13.64 < 3(19) = 57$, do not reject $H_0$ at the $\alpha = 0.05$ level.