

| Jude Person | Height | Weight | r women | r men |
|----------------|--------|--------|---------|-------|
| A | 158 | 72 | .98 | .02 |
| B | 162 | 56 | .95 | .05 |
| C | 166 | 60 | | |
| D | 175 | 72 | .10 | .90 |
| E | 180 | 78 | .05 | .95 |
| F | 175 | 84 | .02 | .98 |

Remainder

Part A: E-Skp

$$|\Sigma_{\text{women}}| = \begin{bmatrix} 9 & 0 \\ 0 & 16 \end{bmatrix}$$

$$\mu_{\text{women}} = \begin{bmatrix} 160 \\ 55 \end{bmatrix}$$

$$\pi_{\text{women}} = 0.5$$

$$|\Sigma_{\text{women}}| = \begin{bmatrix} 9 & 0 \\ 0 & 16 \end{bmatrix} = 144$$

$$\sqrt{144} = 12$$

$$2(3.14159)^{1/2} \times 12 = 75.39$$

$$N(A | \mu_{\text{women}}, \Sigma_{\text{women}}) = \frac{1}{75.39} \exp\left(-\frac{1}{2} \chi^2 5.625\right) = 8.2187 \times 10^{-9}$$

$$|\Sigma_{\text{men}}| = \begin{bmatrix} 16 & 0 \\ 0 & 25 \end{bmatrix} = 400$$

$$\sqrt{400} = 20$$

$$2(3.14159)^{1/2} \times 20 = 125.66$$

$$N(A | \mu_{\text{men}}, \Sigma_{\text{men}}) = \frac{1}{125.66} \exp\left(-\frac{1}{2} \chi^2 25.21\right) = 2.470 \times 10^{-8}$$

Compute Residuals

$$r_{\text{women}} =$$

$$\Sigma^{-1} = \frac{1}{144} \begin{bmatrix} 16 & 0 \\ 0 & 9 \end{bmatrix}$$

$$(X - \mu)^T \Sigma^{-1} (X - \mu) = \frac{6^2}{9} + \frac{5^2}{16} = 5.625$$

$$\Sigma^{-1} = \frac{1}{400} \begin{bmatrix} 16 & 0 \\ 0 & 25 \end{bmatrix}$$

$$(X - \mu)^T \Sigma^{-1} (X - \mu) = \frac{-14^2}{16} + \frac{18^2}{25}$$

$$= 25.21$$