

Question 3 Problem 6a:

From Handout pages 69-70

If $Y \sim t_v(\mu, \Lambda)$ and w is a vector of weights $w = \left(\frac{1}{2}, \frac{1}{2}\right)$, then $w^T Y \sim t_v(w^T \mu, w^T \Lambda w)$ which is **univariate t**

$$\text{Mean} = w^T \mu = (.5 \quad .5) \begin{pmatrix} 0.001 \\ 0.002 \end{pmatrix} = 0.0015$$

$$\text{Variance} = \text{var}(w^T Y) = w^T \Sigma w = (.5 \quad .5) \begin{pmatrix} 0.10 & 0.03 \\ 0.03 & 0.15 \end{pmatrix} \begin{pmatrix} .5 \\ .5 \end{pmatrix} = 0.0775$$

$$w^T Y \sim t_5(0.0015, 0.0775)$$