

**Quiz Problem 8**

Let the sample covariance matrix be given by

$$\Sigma = \begin{bmatrix} 5 & 1 \\ 1 & 5 \end{bmatrix}.$$

Find the second principal component direction and the projection of the data matrix

$$X = \begin{bmatrix} 0 & 1 \\ -1 & 1 \\ 2 & 0 \end{bmatrix}$$

onto the second principal component direction.