Assignment 3

Q 1 a) What is a Linear Vector Space? Explain.

   b) Prove that for any linear transformation between two finite dimensional vector spaces there is a matrix representation.

Q 2. a) Give the procedure of Gram - Schmidt Orthogonalization.

   b) Find the orthogonal set for the following independent vectors:

$$y1= \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix} \qquad y2= \begin{bmatrix} -1 \\ 0 \\ 2 \end{bmatrix} \qquad y3= \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

Q 3 a) What is linear transformation? Explain with an example.

   b) Find Eigen Values and Eigen Vectors for

   A=   cos A   -Sin A

          Sin A   Cos A

Q 4 a) Explain the steps of Principal Component Analysis, with an example.

   b) What are orthogonal spaces?

Q 5 a) Analyze the performance of supervised Hebbian learning for the linear associator.

   b) Using Pseudo Inverse Rule,

   find whether P1= [1,-1,-1], t1=[-1] and P2=[1,1,-1],t2=[1], converges.