FDS

Week 4

Problems

Problem 1:

Find eigenvalues and corresponding eigenvectors of the following matrices:
a)

$$\begin{pmatrix} 4 & 1 \\ 1 & 4 \end{pmatrix},$$

b)

$$\begin{pmatrix} 3 & 8 \\ 2 & 5 \end{pmatrix},$$

c)

$$\begin{pmatrix} 1 & -1 & 0 \\ -1 & 1 & 0 \\ 0 & 0 & 4 \end{pmatrix},$$

Problem 2:

a) Diagonalise the following matrix:

$$A = \begin{pmatrix} 0.6 & -0.4 & 0 \\ -0.4 & 0.6 & 0 \\ 0 & 0 & 0.5 \end{pmatrix},$$

Hence, find A^k as $k \to \infty$.

Problem 3:

If we know the eigenvalues of A, what are the eigenvalues of A^2? What about A^k?

Problem 4:

Find matrices U, Σ, V for the following matrices:
a)

$$\begin{pmatrix} 3 & 0 \\ 4 & 5 \end{pmatrix},$$

b)

$$\begin{pmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \end{pmatrix}.$$