Course 2E02 2011 (SF Engineers & MSISS & MEMS)

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Due: at the end of the tutorial

Exercise 1

Find the characteristic polynomials of the following matrices:

(ii) $\begin{pmatrix} 0 & 5 \\ -1 & 0 \end{pmatrix}$;

(iii) $\begin{pmatrix} 1 & 1 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$;

(iv) $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 0 & -2 & 1 \end{pmatrix}$.

Exercise 2

Find the eigenvalues and corresponding eigenvectors of the following matrices:

(i) $\begin{pmatrix} 1 & 0 \\ 1 & 2 \end{pmatrix}$;

(ii) $\begin{pmatrix} 1 & 1 & -1 \\ 0 & 2 & 1 \\ 0 & 2 & 1 \end{pmatrix}$;

Exercise 3

Find a matrix P that diagonalizes each matrix A in Exercise 2 and determine the corresponding diagonal matrix $D = P^{-1}AP$.