

**Course 2E02 2012 (SF Engineers & MSISS & MEMS)****S h e e t 7**

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Due: at the end of the tutorial

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**Exercise 1**

Find the least squares approximate solution of the linear system:

$$\begin{cases} x = -1 \\ y = 0 \\ y + z = 2 \\ x + y + z = 0 \end{cases}.$$

**Exercise 2**

Find the characteristic polynomials of the following matrices:

(ii)  $\begin{pmatrix} 0 & 3 \\ -1 & 0 \end{pmatrix};$

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

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

**Exercise 3**

Find the eigenvalues and corresponding eigenvectors of the following matrices:

(i)  $\begin{pmatrix} 5 & 0 \\ 1 & 2 \end{pmatrix};$

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