

Course 2E02 2010 (SF Engineers & MSISS & MEMS)**S h e e t 5**

Due: at the end of the tutorial

Exercise 1

Find bases and dimensions for the row, column and null spaces of the matrix:

(i) $\begin{pmatrix} 1 & 4 & 0 \\ -1 & -2 & 1 \end{pmatrix}$;

(ii) $\begin{pmatrix} 1 & -2 \\ -1 & 2 \\ 4 & 0 \end{pmatrix}$;

Exercise 2

Find the subset of the vectors that forms a basis of their span:

(i) $\mathbf{u}_1 = (1, -1, 1)$, $\mathbf{u}_2 = (-3, 3, -3)$.

(ii) $\mathbf{u}_1 = (2, -1, 1)$, $\mathbf{u}_2 = (1, 1, 1)$, $\mathbf{u}_3 = (0, -3, -1)$.

Exercise 3

Find the rank and the nullity of the matrix:

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

(ii) $\begin{pmatrix} -2 & 1 & -1 \\ 1 & 1 & 1 \\ 1 & 4 & 2 \end{pmatrix}$.