

Course 2E01 2015 (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) $\begin{pmatrix} 1 & 2 & 0 \\ -1 & -1 & 1 \end{pmatrix}$;

(ii) $\begin{pmatrix} 1 & 2 \\ -3 & -6 \\ 4 & 8 \end{pmatrix}$.

Exercise 2

Find the rank and the nullity of the matrix:

(i) $\begin{pmatrix} 2 & 2 & -2 \\ -3 & -3 & 3 \end{pmatrix}$;

(ii) $\begin{pmatrix} 4 & -3 & -3 \\ 2 & 1 & 1 \\ 5 & 0 & 0 \end{pmatrix}$.

Exercise 3

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

(i) $\mathbf{v}_1 = (1, -1, 1)$, $\mathbf{v}_2 = (-2, 2, -2)$;

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