

## Course 2E01 2018 (SF Engineers &amp; MSISS &amp; MEMS)

## Sheet 6

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Due: at the end of the tutorial

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**Exercise 1**

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

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

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

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

**Exercise 2**

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

(i)  $\mathbf{v}_1 = (1, -1, -2), \mathbf{v}_2 = (-2, 2, 4);$

(ii)  $\mathbf{v}_1 = (2, 1), \mathbf{v}_2 = (1, 2), \mathbf{v}_3 = (1, 1), \mathbf{v}_4 = (1, -2).$

**Exercise 3**

Find the rank and the nullity of the matrix:

(i)  $\begin{pmatrix} 2 & -2 & 4 \\ -3 & 3 & -6 \end{pmatrix};$

(ii)  $\begin{pmatrix} 4 & -3 & -6 \\ 2 & 1 & 2 \\ 2 & 0 & 0 \end{pmatrix}.$