

**Course 2E01 2016 (SF Engineers & MSISS & MEMS)****S h e e t 3**

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Due: at the end of the tutorial

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**Exercise 1**

- (i) Find parametric equations for the line spanned by the vector:

$$\mathbf{u} = (3, -1, 2);$$

- (ii) Give a system of linear equations that determines the line in (i).  
(iii) Find an equation for the plane generated (spanned) by the vectors:

$$\mathbf{u} = (-1, 1, -2), \quad \mathbf{v} = (-1, 3, 0).$$

**Exercise 2**

Determine which of the following are subspaces of  $\mathbb{R}^3$ :

- (i) the set of all vectors of the form  $(a, a, -a)$ ;  
(ii) the set of all vectors of the form  $(1, 0, a)$ ;  
(iii) the set of all vectors of the form  $(a, b, -b)$ .

**Exercise 3**

Determine whether the vectors span  $\mathbb{R}^3$ :

- (i)  $\mathbf{v}_1 = (1, 3, 6)$ ,  $\mathbf{v}_2 = (-2, 4, 2)$ ,  $\mathbf{v}_3 = (1, 0, 0)$ ;

Determine whether the vectors span  $\mathbb{R}^2$ :

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