

Course 2E02 2015 (SF Engineers & MSISS & MEMS)**S h e e t 3**

Due: at the end of the tutorial

Exercise 1

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

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

- (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:

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

Exercise 2

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

- (i) the set of all vectors of the form $(-a, 2a, 0)$;
(ii) the set of all vectors of the form $(2, 0, a)$;
(iii) the set of all vectors of the form $(b, -b, a)$.

Exercise 3

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

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

Determine whether the vectors span \mathbb{R}^4 :

- (ii) $\mathbf{v}_1 = (1, 1, 2, 1)$, $\mathbf{v}_2 = (1, 0, -1, 0)$, $\mathbf{v}_3 = (1, 0, 2, 0)$, $\mathbf{v}_4 = (0, 0, 1, -2)$.