

**Course 2E2 2007-08 (SF Engineers & MSISS & MEMS)****S h e e t 4**

---

Due: at the end of the tutorial

---

**Exercise 1**

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

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

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

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

**Exercise 2**

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

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

- (ii) Give two equations that determine the line in (i).
- (iii) Find an equation for the plane spanned by the vectors:

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