Course 2E1 2006-07 (SF Engineers & MSISS & MEMS)

S h e e t 16

Due: at the end of the tutorial

Exercise 1

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

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

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

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

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

Exercise 2

Find parametric equations for the line spanned by the vector:

(i) $\mathbf{u} = (2, 0, -3)$;

(ii) $\mathbf{u} = (0, 2, 1, 0, 6, 5)$;

Find an equation for the plane spanned by the vectors:

(ii) $\mathbf{u} = (1, -1, 1)$, $\mathbf{v} = (-1, 0, 1)$;