## Course 2E02 2012 (SF Engineers & MSISS & MEMS)

Sheet 1

Due: at the end of the tutorial

## Exercise 1

Find  $\mathbf{v} + \mathbf{u}$ ,  $2\mathbf{v}$ , the length  $||\mathbf{u}||$ ,  $||\mathbf{v}||$ , the dot product  $\mathbf{u} \cdot \mathbf{v}$ , the angle between  $\mathbf{u}$  and  $\mathbf{v}$  and determine whether  $\mathbf{u}$  and  $\mathbf{v}$  are orthogonal (or for which values of parameters  $\mathbf{u}$  and  $\mathbf{v}$  are orthogonal, if any are present):

- (i)  $\mathbf{u} = (1, -2, 0), \mathbf{v} = (2, 1, 1);$
- (ii)  $\mathbf{u} = (1, -1, 0, 1, 0), \mathbf{v} = (1, 0, 2, -1, 0);$
- (iii)  $\mathbf{u} = (3, k, 0, -k), \mathbf{v} = (0, k, 1, -2);$
- (iv)  $\mathbf{u} = (a, c, 0, b, 0), \mathbf{v} = (c, a, -c, 0, b).$

## Exercise 2

Write the system in the matrix form: (i)

$$\begin{cases} 2x + z = 1\\ z - y = 4 \end{cases}$$

(ii)

$$\begin{cases} 2x + z - t = -1\\ t - 2y = 1\\ y + z - x = 4 \end{cases}$$