

**Course 2E02 2013 (SF Engineers & MSISS & MEMS)****S h e e t 1**

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Due: at the end of the tutorial

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

**Exercise 2**

Write the system in the matrix form:

(i)

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

(ii)

$$\begin{cases} 2x - t + 3z = -1 \\ t - 2y = -1 \\ -y + z - x = 4 \end{cases}$$