

Course 2E02 2014 (SF Engineers & MSISS & MEMS)**S h e e t 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) $\mathbf{u} = (1, 0, 2)$, $\mathbf{v} = (2, 1, -1)$;
- (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) $\mathbf{u} = (a, c, 0, b, 0)$, $\mathbf{v} = (c, -2a, c, 0, b + c)$.

Exercise 2

Write the system in the matrix form:

(i)

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

(ii)

$$\begin{cases} 2x - t + z = -1 \\ t - 2y = -7 \\ -y + z - x = 4 \end{cases}$$