

**Course 2E2 2007-08 (SF Engineers & MSISS & MEMS)****S h e e t 9**

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Due: at the end of the tutorial

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**Exercise 1**

Calculate the coordinates of  $\mathbf{v}$  relative to the orthogonal basis

$$\{(-1, 0, 0), (0, 3, -4), (0, 4, 3)\} :$$

- (i)  $\mathbf{v} = (1, 1, 1)$ ;
- (ii)  $\mathbf{v} = (-1, 1, -1)$ .

**Exercise 2**

Use the Gram-Schmidt process to transform the given basis into orthogonal one:

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