Course 2E02 2011 (SF Engineers & MSISS & MEMS)

S h e e t 6

Due: at the end of the tutorial

Exercise 1

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

$$\{(-1, 0, 0), (0, 2, 1), (0, -1, 2)\} :$$

(i) $\mathbf{v} = (2, -1, 3)$;

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

Exercise 2

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

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

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

Exercise 3

Find the least squares approximate solution of the linear system:

$$\begin{cases} x = 1 \\ y = 0 \\ y + z = 1 \\ x + y + z = 0 \end{cases}.$$