

Course 2E2 2008-09 (SF Engineers & MSISS & MEMS)**S h e e t 9**

Due: at the end of the tutorial

Exercise 1

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

Exercise 2

Find the least squares approximate solution of the linear system:

- (i) $\begin{cases} x = -1 \\ 2x = 1 \end{cases}$;
- (ii) $\begin{cases} x = 1 \\ y = 1 \\ z = 1 \\ x + y + z = 0 \end{cases}$.