Course 2E2 2007-08 (SF Engineers & MSISS & MEMS)

S h e e t   8

Due: at the end of the tutorial

Exercise 1

Calculate the length of $\mathbf{u} = (1, -1, -1)$, the distance between $\mathbf{u}$ and $\mathbf{v} = (1, 0, 1)$ and the angle between $\mathbf{u}$ and $\mathbf{v}$

(i) with respect to the standard dot product;

(ii) with respect to the inner product given by $\langle \mathbf{u}, \mathbf{v} \rangle = u_1 v_1 + 2 u_2 v_2 + 3 u_3 v_3$.

Exercise 2

Which of the following bases are orthogonal and which are orthonormal?

(i) $(1, 0)$, $(0, -14)$;

(ii) $(0, 0, 2)$, $(1, -1, 0)$, $(1, 1, 0)$;

(iii) $(-1, 0, 0)$, $(0, \frac{3}{5}, \frac{4}{5})$, $(0, -\frac{4}{5}, \frac{3}{5})$;