

Course 2E1 2006-07 (SF Engineers & MSISS & MEMS)**S h e e t 19**

Due: at the end of the tutorial

Exercise 1

Calculate the length of $\mathbf{u} = (1, 1, -1)$, the distance between \mathbf{u} and $\mathbf{v} = (1, 1, 1)$ 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 $\langle \mathbf{u}, \mathbf{v} \rangle = u_1 v_1 + 3u_2 v_2 + 2u_3 v_3$.

Exercise 2

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

- (i) $(-1, 0), (0, 6)$;
- (ii) $(0, 0, 1), (1, -1, 0), (1, 1, 0)$;
- (iii) $(0, 1, 0), (\frac{3}{5}, 0, -\frac{4}{5}), (\frac{4}{5}, 0, \frac{3}{5})$;