January 5, 2009 Lecturer Dmitri Zaitsev Hilary Term 2009

Course 2E2 2008-09 (SF Engineers & MSISS & MEMS)

S h e e t 8

Due: at the end of the tutorial

Exercise 1

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

(i) $(1,0)$, $(0,-3)$;

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

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

Exercise 2

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

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

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

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