

**Course 2E1 2005-06 (SF Engineers & MSISS & MEMS)**

S h e e t 13

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Due: in the tutorial sessions next Wednesday/Thursday

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**Exercise 1**

Find  $\mathbf{u} - \mathbf{v}$ ,  $2\mathbf{v}$ ,  $\|\mathbf{v}\|$ , the dot product  $\mathbf{u} \cdot \mathbf{v}$  and determine whether  $\mathbf{u}$  and  $\mathbf{v}$  are orthogonal (or for which values of parameters  $\mathbf{u}$  and  $\mathbf{v}$  are orthogonal, if any are present):

- (i)  $\mathbf{u} = (1, 3, 0)$ ,  $\mathbf{v} = (-3, 1, 0)$ ;
- (ii)  $\mathbf{u} = (1, 0, 1, 0)$ ,  $\mathbf{v} = (1, 1, -1, 1)$ ;
- (iii)  $\mathbf{u} = (k, 0, 1, -k)$ ,  $\mathbf{v} = (k, 2, 1, 2)$ ;
- (iv)  $\mathbf{u} = (a, b, 0, c)$ ,  $\mathbf{v} = (-2b, a, c, 0)$ .