September 16, 2019 Lecturer Dmitri Zaitsev

**MAU22E01 2019 (SF Engineers & MSISS & MEMS)**

S h e e t 1

Due: at the end of the tutorial

## Exercise 1

Find $\mathbf{v}+\mathbf{u}$, $-2\mathbf{v}$, $\mathbf{u}-2\mathbf{v}$, the norms $\|\mathbf{u}\|$, $\|\mathbf{v}\|$ and the dot product $\mathbf{u}\cdot\mathbf{v}$, where

(i) $\mathbf{u}=(2,0,1)$, $\mathbf{v}=(2,1,-1)$;

(ii) $\mathbf{u}=(1,0,0,-1,0,1)$, $\mathbf{v}=(0,2,0,0,1,k)$;

(iii) $\mathbf{u}=(-3,k,0,k)$, $\mathbf{v}=(0,2k,-1,-2)$.

## Exercise 2

For $\mathbf{u}$ and $\mathbf{v}$ as in Excercise 1, find the angle between $\mathbf{u}$ and $\mathbf{v}$ 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).