

Course 2E01 2017 (SF Engineers & MSISS & MEMS)**S h e e t 4**

Due: at the end of the tutorial

Exercise 1

Determine which of the following are subspaces:

- (i) the set of all vectors of the form $(a, 2a)$;
- (ii) the set of all vectors of the form $(a, 0, a + b)$;
- (iii) the set of all vectors of the form $(b, 2a, -b, 1 - b)$.

Exercise 2

Which of the following sets of vectors are linearly dependent?

- (i) $(1, -1), (-1, 0)$;
- (ii) $(0, 1, 1), (1, -1, 0), (-2, 0, -2)$;
- (iii) $(-1, 0, 1, 0, 0), (0, 2, 3, 1, 1), (0, -2, 0, 0, 1)$.

Exercise 3

Which of the following sets of vectors are bases for the corresponding space \mathbb{R}^n ? (The dimension n should be clear from the length of vectors.)

- (i) $(1, 1)$;
- (ii) $(1, 0), (1, -2)$;
- (iii) $(1, 1), (2, 2)$;
- (iv) $(1, -1), (15, 222), (-1, 1)$;
- (v) $(1, -1, 2, 0), (1, 1, 5, -3), (1, -1, 2, 1)$;
- (vi) $(1, 0, 1), (1, 1, 0), (2, 1, 0)$.