

PROBLEM SET 3

Problem 1. Exercises 2.1.1, 2.1.2–2.1.4, 2.2.3, 2.2.4, 2.2.5, 2.2.8, and 2.2.10 on pages 27–30.

Problem 2. Exercises 2.3.4, 2.3.8, 2.3.10, 2.3.16, and 2.3.17 on pages 32–34.

Problem 3. Exercise 2.4.1 on page 36.

Problem 4. Find the distance of the (linear) code

$$C = \{00000000, 10101011, 11111100, 01010111\}.$$

Determine s , the error-detecting capability of C , and then find an error pattern of weight $s+1$ which is not detected by C . Determine t , the error-correcting capability of C , and then find an error pattern of weight $t+1$ which is not corrected by C .

Problem 5. Consider the subset

$$S = \{11000, 00011, 01110\}$$

of K^5 .

- (a) Find the code C generated by S (i.e., list all of its codewords).
- (b) Find C^\perp , the dual code of C (i.e., list all of its codewords).

Problem 6. Prove that a linear code detects an error pattern e if and only if e is not a codeword.

Problem 7. Exercise 2.5.3 on page 38.

Problem 8. Exercises 2.5.10 and 2.5.12 on page 41.