

Problem sheet 3
2004, Jan. 29

MT361 ERROR CORRECTING CODES

Ex. 1

Given a binary $(11, 24, 5)$ -code. Argue why this code cannot be linear.

Ex. 2

Let E_n be the set of all elements of $V(n, 2)$ with even weight. Show that E_n is a linear code. What are its parameters $[n, k, d]$? What is M ? Write down a generator matrix in standard form.

Ex. 3

Prove that, in a binary linear code, either all the codewords have even weight or exactly half have even weight and half have odd weight.

Ex. 4

Let C_1 and C_2 be binary linear codes having the generator matrices

$G_1 = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 \end{bmatrix}$ and $G_2 = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 \end{bmatrix}$. List the codewords of C_1 and C_2 and hence find the minimum distance of each code.

Hand in solutions at the beginning of the lecture on Thursday of the next week.