

$$1) a) 52 \left\{ \binom{12}{0} + \binom{12}{1} + \binom{12}{2} \right\} = 52 \cdot 79 = 4108 \neq 9^{12} = 4086$$

olduğundan bu parametrelere sahip kod yoktur.

$$b) \left\{ (000000), (011111), (222210), (101222) \right\}$$

c) Tekrar kodu 30 bnu

2) a) Lineerdir. (Aritmetik sorunun geneli olduğundan çözümü aradıkları gibi yapabilirsiniz)

$$b) G = \begin{bmatrix} 1 & 0 & 0 & \dots & 1 \\ 0 & 1 & 0 & \dots & 1 \\ & & & & \\ & & & & \\ 0 & 0 & \dots & 0 & 1 \end{bmatrix}$$

$$c) k = n-1, d = 2 : 1^1 + 5 \cdot 1^5 + 3 \cdot 1^3 = 0$$

$$d) H = [11 \dots 1 : 1]$$

$$e) A_n^\perp = \{(00 \dots 0), (11 \dots 1)\}$$

$$3) d(x, y) = w(x-y)$$

$$w(y) = w(x - (x-y)) = d(x, x-y) \leq d(x, 0) + d(0, x-y)$$

$$= w(x) + w(y-x)$$

$$\Rightarrow w(y) \leq w(x) + w(y-x)$$

$$\Rightarrow w(y) \leq w(x) + w(x-y)$$

$$\Rightarrow w(x) - w(y) \geq -w(x-y) \quad \text{--- ①}$$

$$w(x) = w(y - (y-x)) \leq w(y) + w(x-y)$$

$$\Rightarrow w(x) - w(y) \leq w(x-y) \quad \text{--- ②}$$

① ve ② den istenilen elde edilir.

$$4) G = \begin{bmatrix} 0 & 1 & b \\ 1 & 0 & a \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & a \\ 0 & 1 & b \end{bmatrix}$$

$$a) H = [a \ b \ 1]$$

$$b) \forall x \in C^\perp \text{ için}$$

$$x = \alpha (a \ b \ 1), \alpha \in \mathbb{F}_4$$

$$3) C^\perp = \{ (0 \ 0 \ 0), (a \ b \ 1), (b \ 1 \ a), (1 \ a \ b) \}$$

c)

$$\begin{array}{r} 0 \ 0 \ 0 \\ 1 \ 0 \ 0 \\ 0 \ 1 \ 0 \\ 0 \ 0 \ 1 \end{array} \begin{array}{l} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{array} \begin{array}{l} 0 \\ a \\ b \\ 1 \end{array}$$

$$d) \cdot S(a, 0, a) = b + a = 1$$

$$x = (a, 0, a) - (0, 0, 1) = (a, 0, b)$$

$$\cdot S(1, 1, b) = a$$

$$x = (1, 1, b) - (1, 0, 0) = (0, 1, b)$$

5) Linear olduğu gösterilmektedir.

Linear kod olduğundan

$$C = \{ (v_1, v_2, v_3) : v_1 + 2v_2 + 3v_3 = 0 \}$$

$$= \{ (v_1, v_2, v_3) : v_2 = 3v_1 + 2v_3 \}$$

$$\textcircled{2} = \{ (v_1, 3v_1 + 2v_3, v_3) : v_1, v_3 \in \mathbb{F}_7 \}$$

$$= \{ v_1 (1, 3, 0) + v_3 (0, 2, 1) : v_1, v_3 \in \mathbb{F}_7 \}$$

$$\Rightarrow G = \begin{bmatrix} 1 & 3 & 0 \\ 0 & 2 & 1 \end{bmatrix}$$

\textcircled{2} de yazılanlara göre G değısebilir.