

Polynômes

n'est pas multiple de d donc le code n'est pas

2 pts

$$b = x^5 + x^2 + x + 1 = d \cdot (x^2 + x) + (x + 1)$$

$$d = x^3 + x^2 + x \text{ est de } P. P. d^2 = r = 3$$

0.5 x 8 = 4 pts

$$e = x^5 + x^4 + x^2; f = x^4 + x^3 + x^2 + x; g = x^5 + x^3 + 1; h = x^5 + x^4 + x^3$$

$$a = 0; b = x^5 + x^2 + x + 1; c = x^4 + x + 1; d = x^3 + x^2 + x$$

Les polynômes de code sont

obtiennent correction de x

$$= 100411$$

$$c = e \oplus x$$

$$\text{Soit } e = 100000$$

$$= v(c)$$

$$v(x) = v(100000)$$

0 0 0
0 1 0
1 0 0
0 1 1
1 1 0
0 1 1
1 0 1
1 0 1
1 1 1

0 0 0 0 0 0
0 0 0 0 1 0
0 0 0 1 0 0
0 0 1 0 0 0
0 0 1 0 0 0
0 0 1 0 0 0
0 0 0 1 0 0
0 0 0 1 0 0
1 0 0 0 0 0
1 0 0 0 0 0

Soit $e' = e \oplus P = 010011$ une

Correction de P.

$$v(b) = v(000010) = v(e')$$

Soit $c'' = b \oplus e' = 111010$ une correction

de R.

1 pt

1 pt

3 pts

2

$$m_7 \rightarrow 111010$$

$$m_6 = 011 = m_2 + m_3 = 0110101; m_7 = 111 = m_6 + m_1$$

$$m_4 = 110 \rightarrow 11001; m_5 = 101 = m_1 + m_3 \rightarrow 101100$$

$$m_3 \rightarrow 001011$$

$$x^3 = (x^3 + x + 1) \cdot \overline{f + x + 1}; P_{m_3}(x) = x^3 + x + 1$$

$$m_3 = 001; P_{m_3}(x) = x^3 + 1$$

$$m_2 \rightarrow 010110$$

$$x^4 = (x^3 + x + 1)(x + \overline{x^2 + x}); P_{m_2}(x) = x^4 + x^2 + x$$

$$m_2 = 010; P_{m_2}(x) = x^4 + x$$

$$P_{m_1}(x) = x^5 + x^2 + x + 1 \text{ est le code de } m_1 \text{ car } 100111$$

$$x^5 \text{ car } g(x) = x^5 = g(x) \cdot (x^2 + 1) + x^2 + x + 1$$

$$P_{m_1}(x) = x^5 + x; \text{ restes de la division}$$

$$r(x) = x^2 \text{ associe } m_1 = 100$$

$$P_{m_1}(x) = r(x) \cdot x^{n-k} + r$$

$m_1 = 100$, le polynôme de code de m_1 est

3) 000 sera le code de par 000000

$g(x)$ ne divise pas x^{n+1} dans le code n'est pas cyclique (3 pts)

$$2) x^6 + 1 = (x^3 + x + 1)g(x) + (x^2)$$

$$1) k = 6 - 3 = 3; r = d = g(x) = 3$$

$$g(x) = x^3 + x + 1$$

Ex 2

(2 pts)

$m_4, m_5, m_6, m_7: 111111 = 4 \text{ pts}$

$m_1, m_2, m_3: 3 + 3 + 3 = 9 \text{ pts}$

Ex 3

1) $a_1 b_1, a_2 b_2, a_3 b_3, a_4 b_4$

$$\begin{cases} a_1 = a_2 + b_2 \\ a_2 = a_3 + b_3 \\ a_3 = a_4 + b_4 \\ a_4 = a_5 + b_5 \\ a_5 = a_6 + b_6 \\ a_6 = a_7 + b_7 \\ a_7 = a_8 + b_8 \\ a_8 = a_9 + b_9 \\ a_9 = a_{10} + b_{10} \end{cases}$$

(6 pts)

2) $a_1 = a_2 + b_2$
 $a_2 = a_3 + b_3$
 $a_3 = a_4 + b_4$
 $a_4 = a_5 + b_5$
 $a_5 = a_6 + b_6$
 $a_6 = a_7 + b_7$
 $a_7 = a_8 + b_8$
 $a_8 = a_9 + b_9$
 $a_9 = a_{10} + b_{10}$

(4 pts)

3) $a_5 = b_5$

(4 pts)

1) $\Delta(m) \neq 0$ dans m n'est pas un motif de code (2 pts)

$$P_m(x) = (x^3 + x + 1)(x^2 + x) + x + 1; \Delta(m) = III.$$

2^e méthode: $P_m(x) = x^5 + x^4 + x^3 + x^2 + 1$

$$\Delta(m) = III.$$

$$= x^2 + x + 1$$

(3 pts)

$$P(x) = 1 + x^2 + x^3 + x^4 + x^5 + x^6 + x^7 + x^8 + x^9 + x^{10}$$

$$r_0 = 1; r_1 = x; r_2 = x^2; r_3 = x + 1; r_4 = x^2 + x; r_5 = x^2 + x + 1$$

r_i est le reste de la division de x^i par $g(x)$.

$$= r_0 + r_1 + r_2 + r_3 + r_4 + r_5$$

$$P(x) = a_0 r_0(x) + a_1 r_1(x) + a_2 r_2(x) + a_3 r_3(x) + a_4 r_4(x) + a_5 r_5(x)$$

$$5) m = III = 1 = a_5 a_4 a_3 a_2 a_1 a_0 = a_5 a_4 a_3 a_2 a_1 a_0$$

$$G = \begin{pmatrix} 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{pmatrix}$$

(2 pts)

6 pts

$$A = \frac{1}{3} \begin{pmatrix} -2 & 0 & 2 \\ 1 & -6 & 2 \\ -4 & 3 & -5 \end{pmatrix}$$

$$A = -\frac{1}{3} \begin{pmatrix} -1 & 0 & 1 \\ -1 & 0 & -2 \\ 1 & -3 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 1 \end{pmatrix}$$

2 + 8 = 10 pts

$$C^{-1} = \frac{1}{|C|} \text{adj}(C) = -\frac{1}{3} \begin{pmatrix} 1 & -1 & 1 \\ 0 & 0 & -3 \\ -2 & 2 & 2 \end{pmatrix}$$

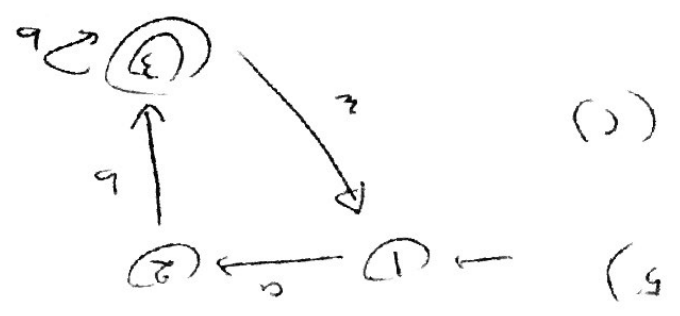
5 pts

4 pts

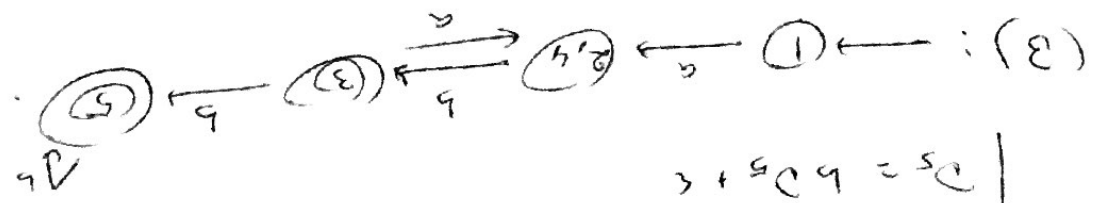
$$A + B = C^{-1}$$

E 4:

4 pts



5 pts



$$d_5 = b d_4 + c$$

$$d_4 = b d_3$$

$$d_3 = a d_2 + b d_4 + c$$

$$d_2 = b d_1$$

$$d_1 = a d_0$$

done $d_1 = d_2 = d_3 = d_4 = d_5$