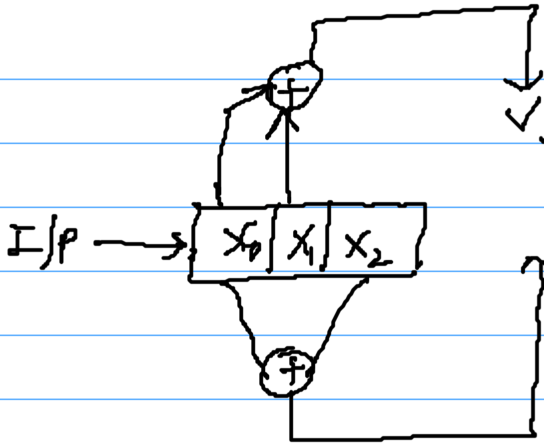
Q.



$V_1 = x_0 \oplus x_1$

$V_2 = x_0 \oplus x_2$

I/P	x_0	x_1	x_2	V_1	V_2
–	0	0	0	–	–
1	1	0	0	1	1
	0	1	0	1	0
	0	0	1	0	1

(1) I.R. ⇒ 111001

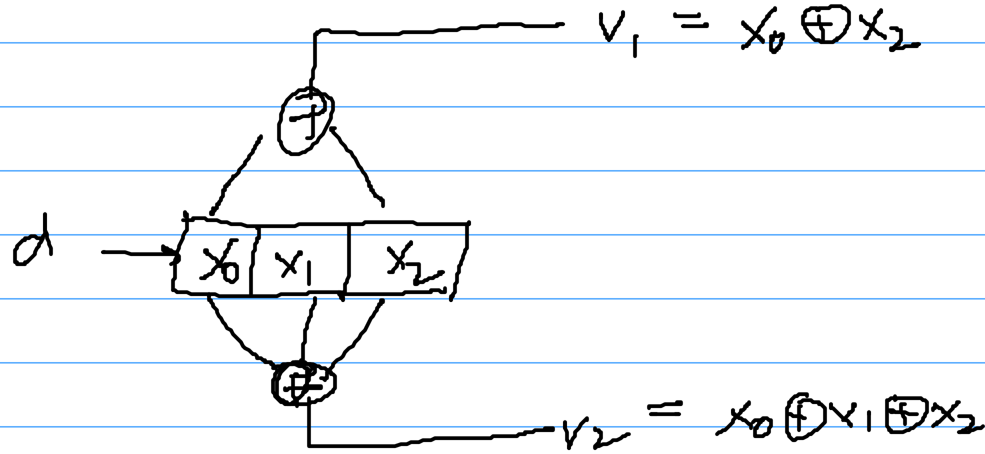
(2) d = $\boxed{1}$1111 ______ using I.R. find C

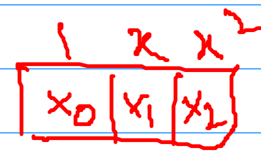
```
11 10 01
   11 10 01
      11 10 01
         11 10 01
            11 10 01
               11 10 01
                    ----
```

c = 1 1 0 1 0 0 0 0 0 0 0 0 ------

Catastrophic Encoder

② polynomial Representation in convolutional code.





① generator polynomia

$$V_1 = x_0 + x_2$$

$$g_1(x) = 1 + x^2$$

$$V_2 = x_0 + x_1 + x_2$$

$$g_2(x) = 1 + x + x^2$$

② data polynomial.

$$d = 101$$

$$d(x) = 1 + x^2$$

③ code polynomial.

$$c_1(x) = d(x)\, g_1(x)$$

$$= (1+x^2)(1+x^2)$$

$$= 1 + x^2 + x^2 + x^4$$

$$= 1 + x^4$$

$$c_2(x) = d(x)\, g_2(x)$$

$$= (1+x^2)(1+x+x^2)$$

$$= 1 + x + x^2 + x^2 + x^3 + x^4$$

$= 1 + x + x^3 + x^4$

Code length $\qquad d_s$

$d = 101 \Rightarrow$ data length $= 3$

Code $(n, k, m) \Rightarrow (2, 1, 3)$

$n = 2,\ k = 1,\ m = 3$

Nos. of clock $\Rightarrow d_s + m - 1$

$= 3 + 3 - 1$

$= 5$

$C_1(x) = 1 + x^4$

$C_2(x) = 1 + x + x^3 + x^4$

$$C(x) = \underbrace{(1, 1)}_{1} + \underbrace{(0, 1)x}_{2} + \underbrace{(0, 0)x^2}_{3} + \underbrace{(0, 1)x^3}_{4} + \underbrace{(1, 1)x^4}_{5}$$

$C = 11\ 01\ 00\ 01\ 11$

(2) $d = 110 \qquad C(x) = ?$

$d = 110$

$d(x) = 1 + x$

$V_1 = X_0 + X_2$

$g_1(x) = 1 + x^2$

$V_2 = X_0 + X_1 + X_2$

$g_2(x) = 1 + x + x^2$

Now

$C_1(x) = d(x)\, g_1(x)$

$= (1 + x)(1 + x^2)$

$= 1 + x^2 + x + x^3$

$= 1 + x + x^2 + x^3$

$c_2(x) = d(x) g_2(x)$

$= (1+x)(1+x+x^2)$

$= 1 + x + x^2 + x + x^2 + x^3$

$= 1 + x^3$

$c_1(x) = 1 + x + x^2 + x^3$

$c_2(x) = 1 + x^3$

$c(x) = (1,1) + (1,0)x + (1,0)x^2 + (1,1)x^3 + (0,0)x^4$

$c = 1\,1\,1\,0\,1\,0\,1\,1\,0\,0$