

GATE 2021-CS Q34

EE23BTECH11052 - Abhilash Rapolu

Question 34:

Consider the cyclic redundancy check (CRC) based error detecting scheme having the generator polynomial $X^3 + X + 1$. Suppose the message $m_4m_3m_2m_1m_0 = 11000$ is to be transmitted. Check bits $c_2c_1c_0$ are appended at the end of the message by the transmitter using the above CRC scheme. The transmitted bit string is denoted by $m_4m_3m_2m_1m_0c_2c_1c_0$. The value of the check bit sequence $c_2c_1c_0$ is

- 1) 101
- 2) 110
- 3) 100
- 4) 111

Message: $m_4m_3m_2m_1m_0 = 11000$ (1)

Generator polynomial: $g(x) = x^3 + x + 1 = 1101$ (2)

Append zeros: 11000000 (3)

Divide by $g(x)$ using modulo-2 division: (4)

1101)11000000 (5)

1101 (6)

1110 (7)

1101 (8)

111 (9)

1101 (10)

100 (11)

Check bits: $c_2c_1c_0 = 100$ (12)

Solution

Parameter	Description	Value
m_4	message bit	1
m_3	message bit	1
m_2	message bit	0
m_1	message bit	0
m_0	message bit	0
c_2	appended bit	
c_1	appended bit	
c_0	appended bit	

TABLE I

GIVEN PARAMETERS LIST