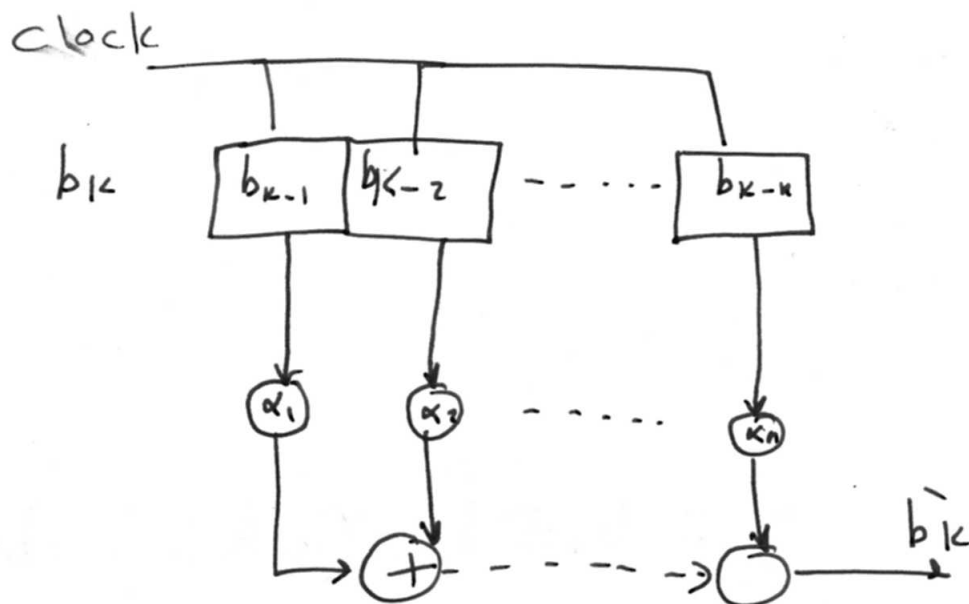


Scramblers and Unscrambler :-

①

Scrambler : The operation applied to the message at the transmitter that randomizes the bit stream eliminating long strings of like bits.

communication II
8/1/2013
Lecture 4



$$b_1 \oplus b_2 \begin{cases} 0 & b_1 = b_2 \\ 1 & b_1 \neq b_2 \end{cases}$$

$$b'_k = \alpha_1 b_{k-1} \oplus \alpha_2 b_{k-2} \oplus \alpha_n b_{k-n}$$

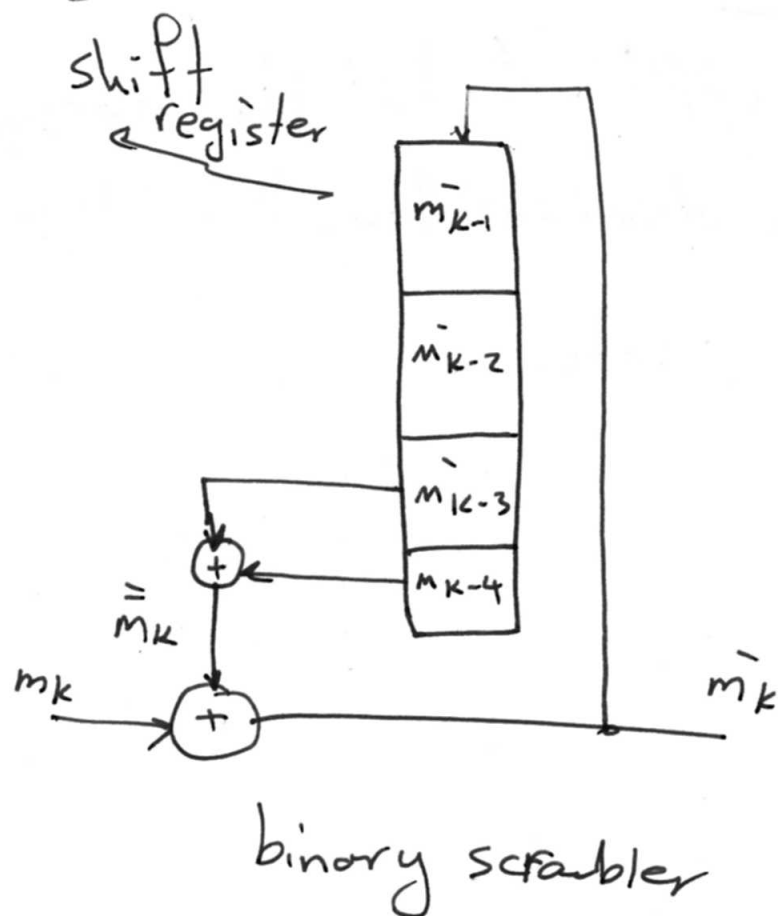
$\alpha_1 = 1$ (direct connection).

$\alpha_1 = 0$ (No connection).

\oplus mod 2-addition

For a more general :-

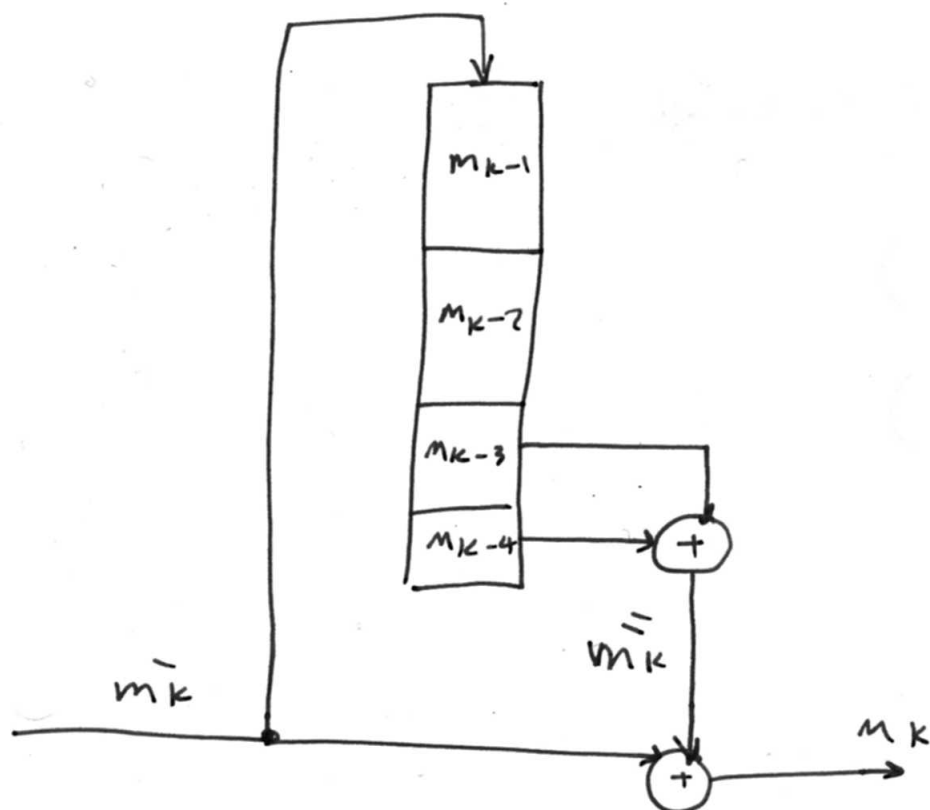
(2)



$$\bar{m}_k = m_k \oplus \bar{\bar{m}}_k$$

$$\begin{aligned} b_1 \oplus b_2 \oplus b_3 &= (b_1 \oplus b_2) \oplus b_3 \\ &= b_1 \oplus (b_2 \oplus b_3) \end{aligned}$$

Unscrambler:



$$\begin{aligned} \bar{m}_k \oplus \bar{\bar{m}}_k &= (m_k \oplus \bar{\bar{m}}_k) \oplus \bar{\bar{m}}_k \\ &= m_k \oplus (\bar{\bar{m}}_k \oplus \bar{\bar{m}}_k) = m_k \oplus 0 = m_k \end{aligned}$$