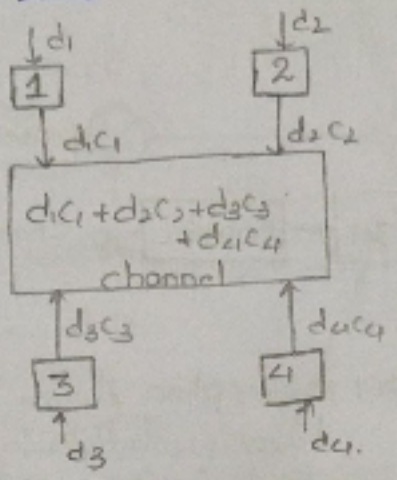
Code Division Multiplexing (CDM).

→ Uses orthogonal codes to transmit different signal over the same channel.

→ It is used in 3rd Generation wireless communicatio like CDMA-2000.



→ here c_1, c_2, c_3, c_4 are orthogonal codes.

→ let us take the codes to be like

$c_1 \rightarrow 1\ 1\ 1\ 1$

$c_2 \rightarrow 1\ -1\ 1\ -1$

$c_3 \rightarrow 1\ 1\ -1\ -1$

$c_4 \rightarrow 1\ -1\ -1\ 1$

→ Now if we multiply the codes we get 0 since they are orthogonal (adjacent)

$c_1 \cdot c_2 = 1 + (-1) + (1) + (-1) = 0$

$c_2 c_4 = 1 + 1 + (-1) + (-1) = 0$

$c_3 \cdot c_3 = 1 + 1 + 1 + 1 = 4.$

→ Let us say data transmitted by

$1 \rightarrow a_1 = a(1)$ i.e., in the code transmiss
$2 \rightarrow a_2 = -a(0)$ if 1 is transmitted replac
$3 \rightarrow a_3 = a(1)$
$4 \rightarrow a_4 = a(1)$ 0 " " "

channel → (a)(1111) + (-a)(1-11-1) + a(11-1-1) + a(1-1-11)

C(x) → aaaa + -aa-aa + aa-a-a + a-a-aa.

→ The above is the channel code according to the above example.

$R_x(1) \rightarrow (C_x)C_2$

$C_x \rightarrow$ (aaaa + -aa-aa + aa-a-a + a-a-aa)(1-11-1)

(a-a-a-a) + (-a-a-a-a) + (a-a-a+a)

+ (a+a-a-a)

→ -4a

→ If we normalise it we get $\frac{-4a}{4} \rightarrow R_x(1) = -a$.

→ (-a) is for 2nd user. So this is how we get the information from code Division multiplexing.