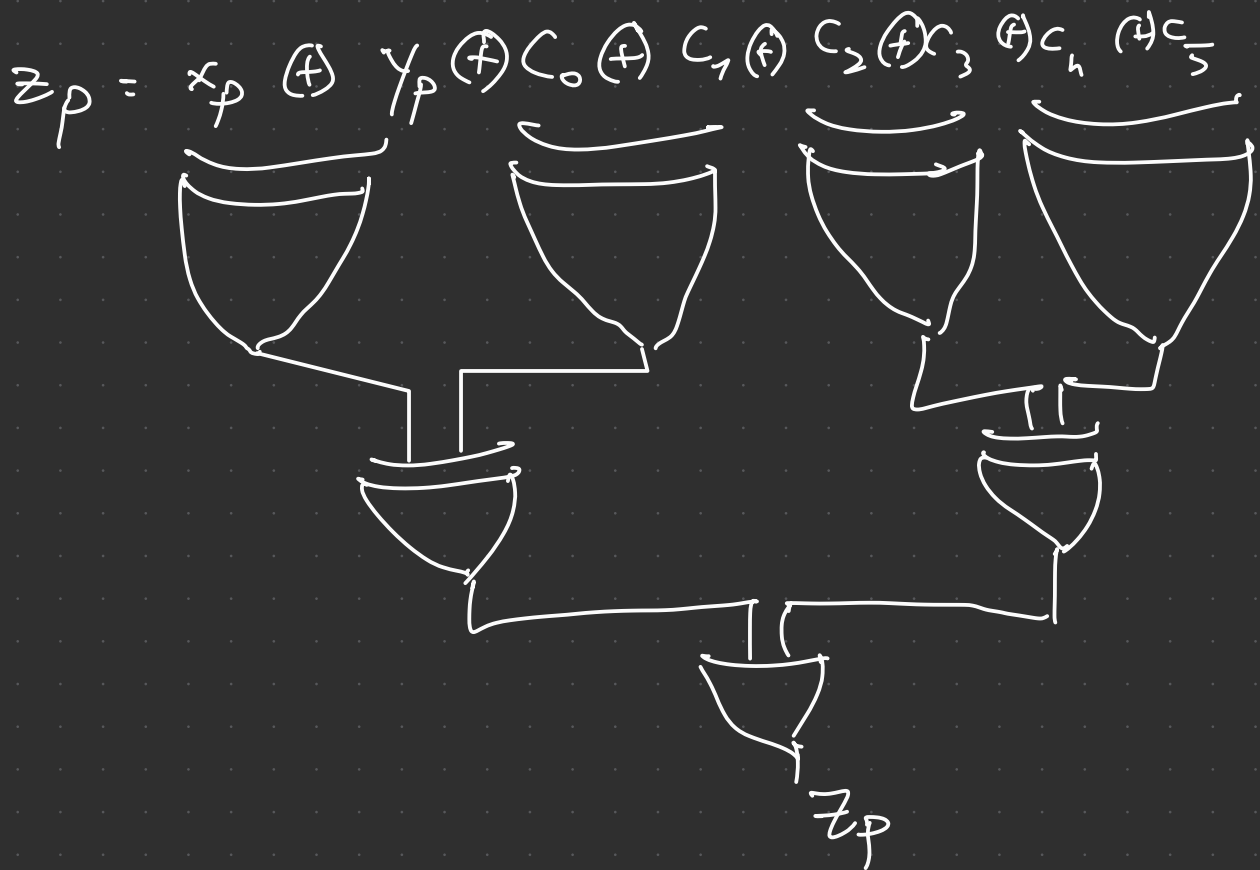
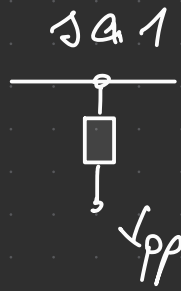
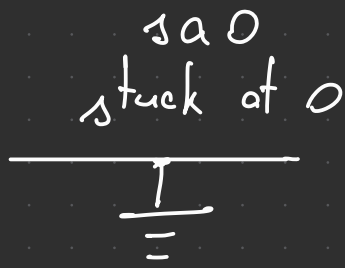


$x, y = 6 \text{ bits}$

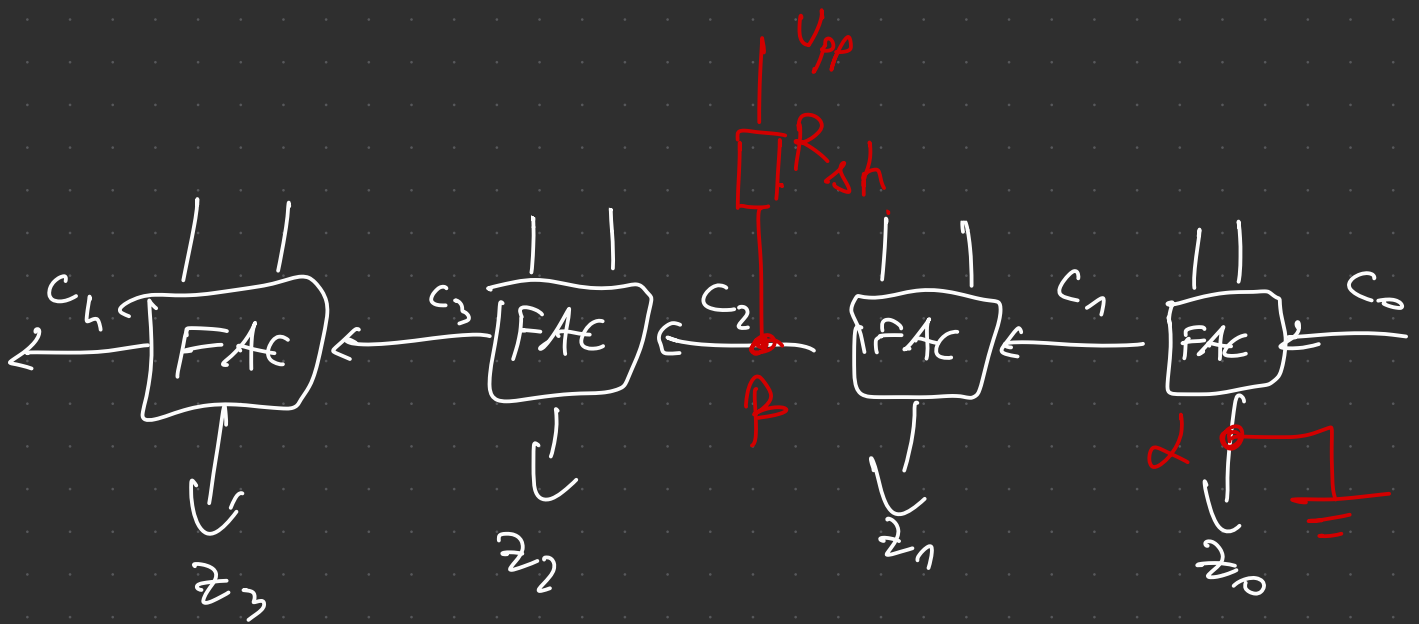
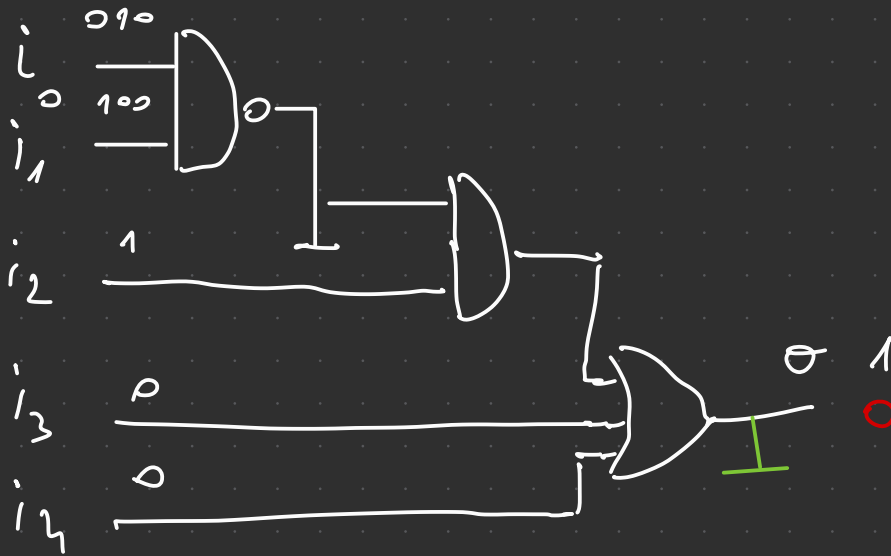


Errori

→ singolare (singură locativ este defectă)
 → multiple



→ afectarea cel
puten un semnal



c_2 modificat → z_2 mod.

C_2

$x_2 = y_2 = 1 \rightarrow C_3 = 1$ indifferent

$x_2 = \overline{y_2} \rightarrow C_3 = C_2$

fault-free

$$\left. \begin{array}{l} x_p = 1 \\ y_p = 1 \\ C_p = 1 \end{array} \right\} z_p^{(2)} = 1$$

$$z_p^{(1)} = 1$$

x	1	1	1	0
y	1	0	0	0
C	1	0	0	0
z	0	1	1	1

z	0	1	1	1
---	---	---	---	---

$\alpha: z_0 100$

x	1	1	1	0
y	1	0	0	0
C	1	0	0	0
z	0	1	1	0

$$\left. \begin{array}{l} x_p = 1 \\ y_p = 1 \\ C_p = 1 \end{array} \right\} z_p^{(2)} = 1$$

$$z_p^{(1)} = 0$$

!!!
defect

B: C_2 101

x	1	1	1	0
y	1	0	0	0
<hr/>				
C	1	1	0	1
z	1	0	1	1

$$x_p = 1$$

$$y_p = 1$$

$$C_p = 1$$

$$z_p(1) = 1$$

$$z_p(2) = 1$$

err. nu
este detectata

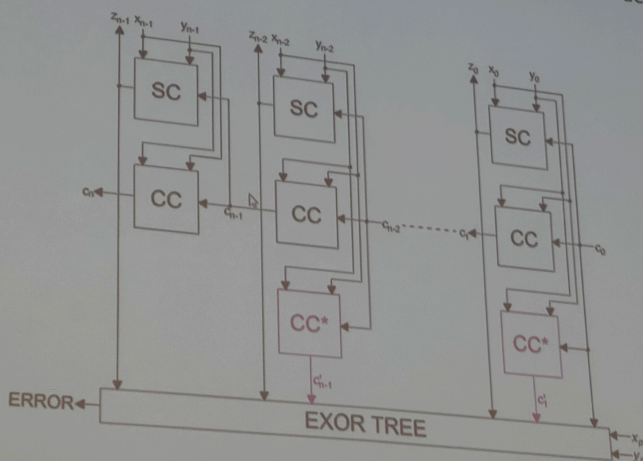
Carry dependent Sum Adder

- duplicarea lanțului de transport
- SC (Sum Cell) $x_i, y_i \rightarrow z_i$
- CC (Carry Cell) $x_i, y_i \rightarrow C_i$

RCA cu duplicarea lanțului de transport

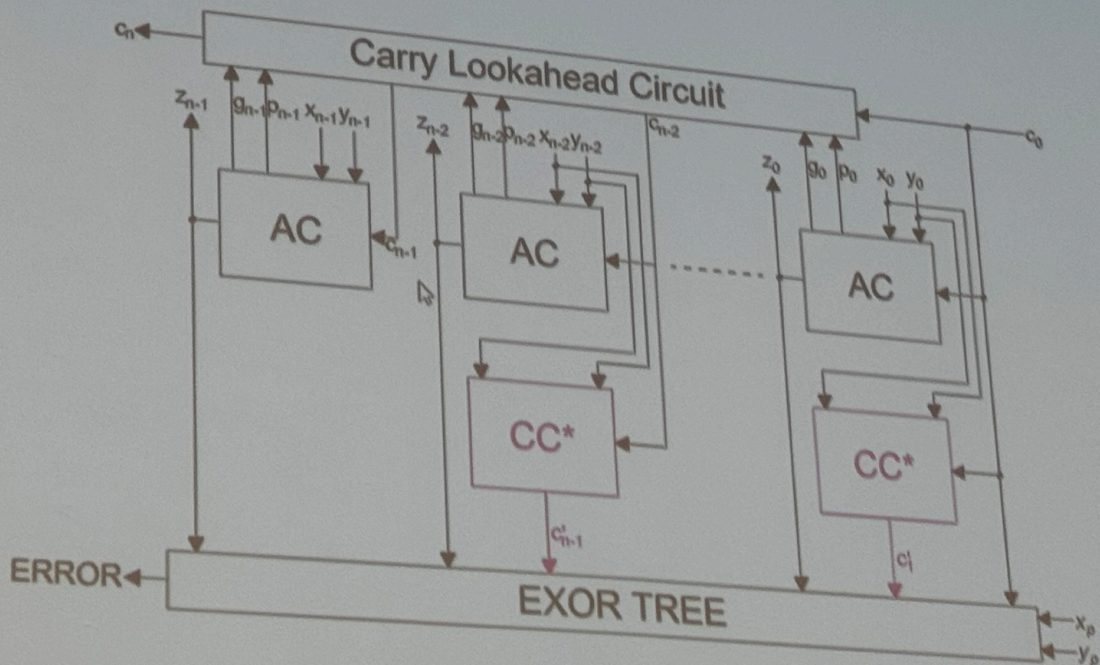
2.4.2 Duplicarea lanțului de transport (contin.)

RCA cu duplicarea lanțului de transport este ilustrat în figura de mai jos:

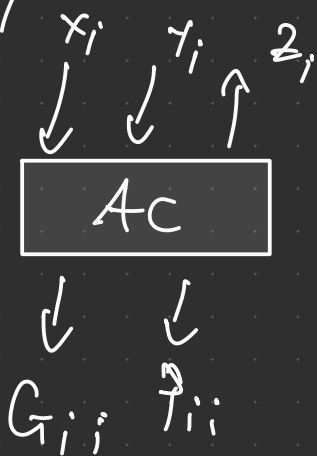


2.4.2 Duplicarea lanțului de transport (contin.)

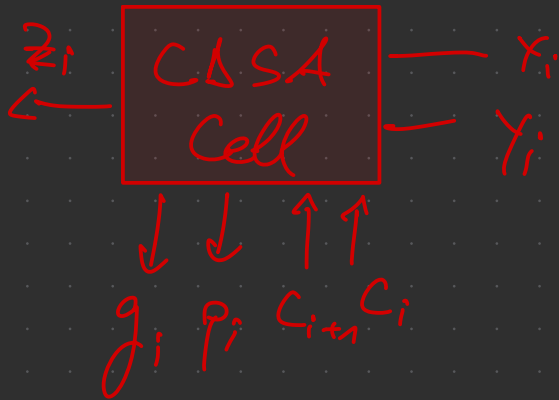
(B) Duplicarea lanțului de transport aplicată pentru Carry Lookahead Adder



→ facilitează detectia erorilor pt. sumatoare
Carry Lookahead



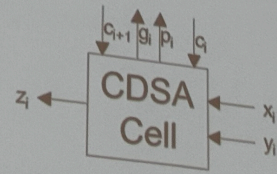
Carry Dependent Sum Adder



2.4.3 Sumator Carry Dependent Sum

- Abordează problema fiabilității încă din faza de proiectare:**
- când c_{i+1} este eronat, sumatorul Carry Dependent Sum (CDSA) forțează bitul sumă z_i la valoare greșită
 - crează un dezechilibru artificial în numărul de biți eronați
 - pe lângă x_i , y_i și c_i , bitul transport c_{i+1} este intrare a celulei CDSA \Rightarrow biții transport trebuie obținuți în maniera lookahead

Simbolul celulei CDSA:

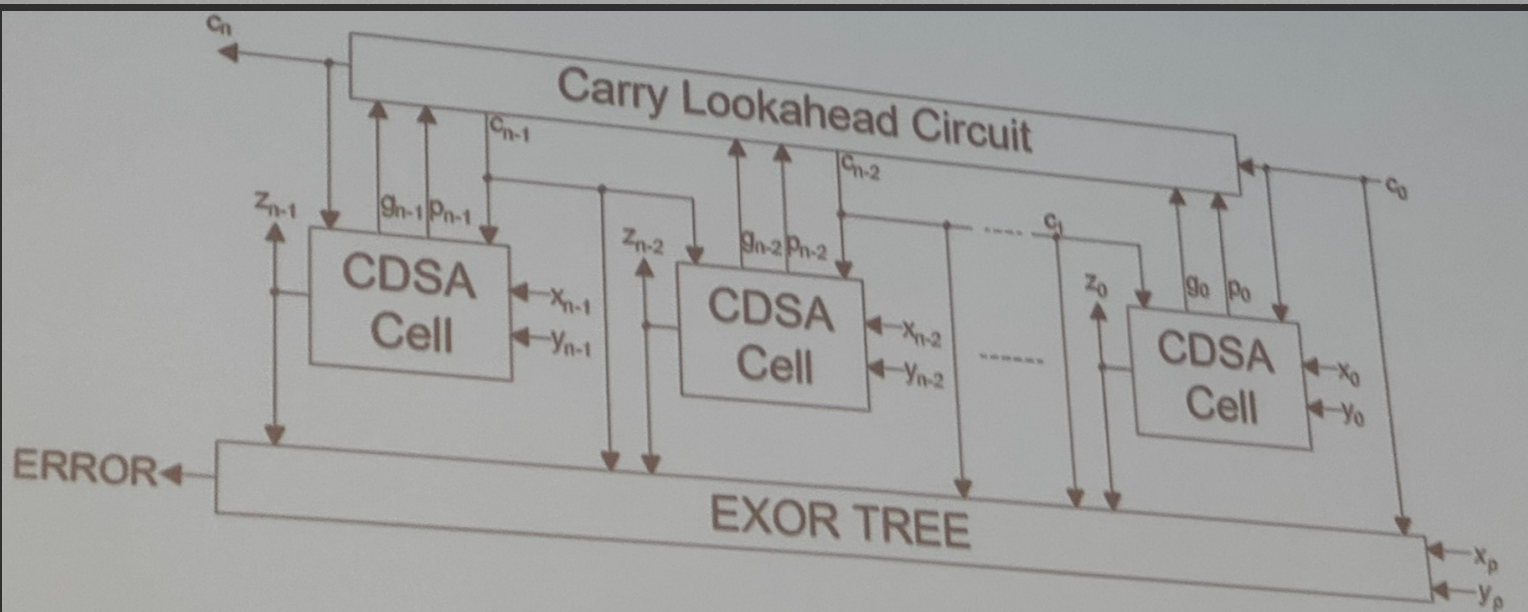
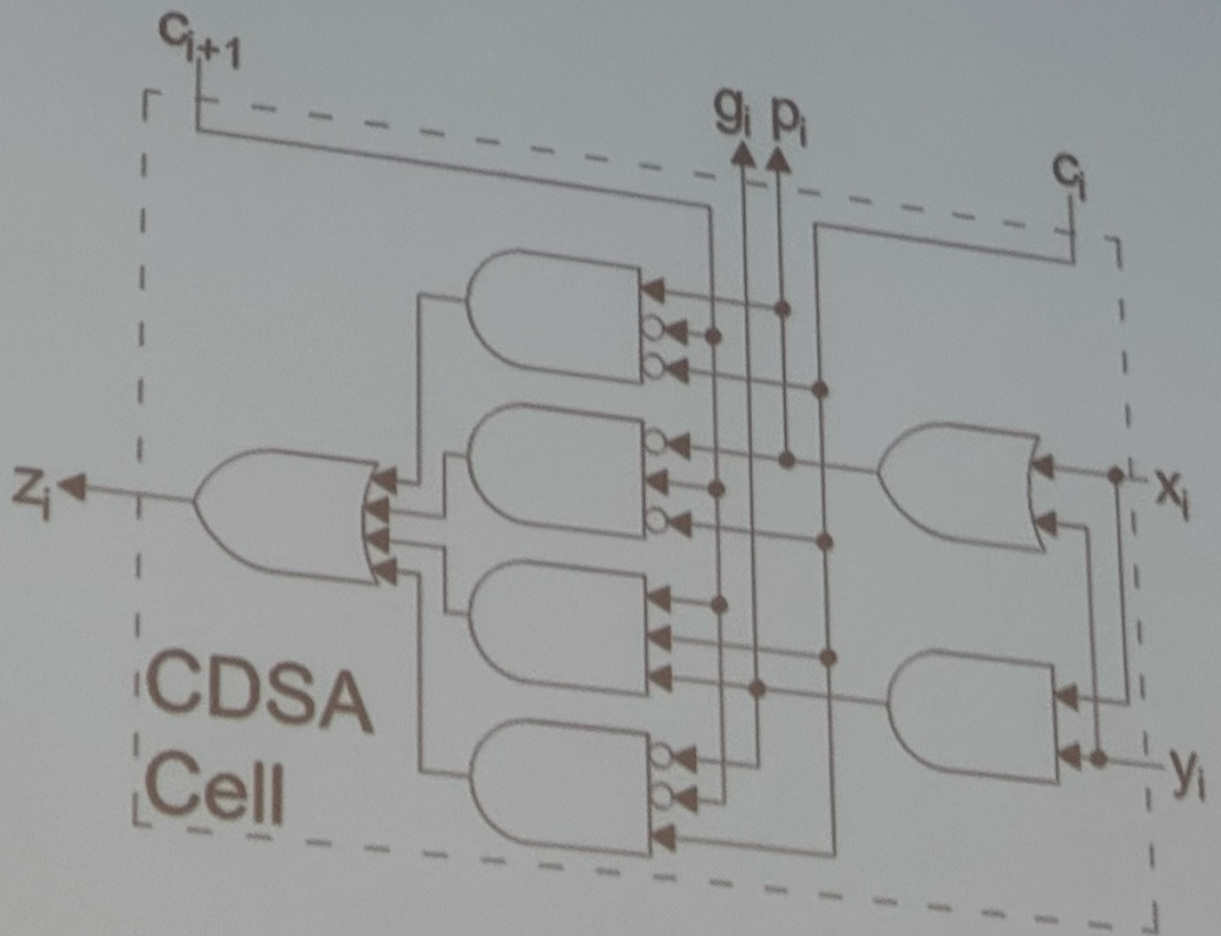


intrare de control

x_i	y_i	c_i	c_{i+1}	z_i
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0

karnaugh $\rightarrow z_{i+1} = \dots$

Sinteza celulei CDSA:



Realizarea unităților aritmetice de singură mobilă

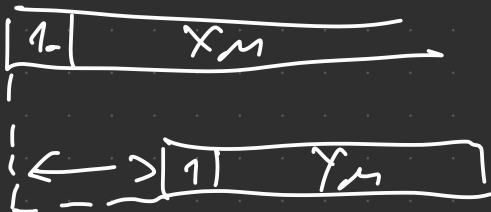
→ IEEE 754

→ împachetate (normalizate)

→ despachetat (pentru calcule) (adăugarea hidden bit)

$$x, y \quad x = x_m \cdot 2^{x_E}$$

$$x + y = \underbrace{(x_m + y_m \cdot 2^{y_E - x_E})}_{\text{mantisă}} \cdot \underbrace{2^{x_E}}_{\text{baza + exp}} \quad \text{if } x_E \geq y_E$$



$$|y_E - x_E|$$

$$x \cdot y = x_m y_m \cdot 2^{(x_E + y_E)}$$

$$x \div y = \underbrace{x_m \div y_m}_{\text{mantisă}} \cdot 2^{(x_E - y_E)}$$

→ m. de singură fixă

$$X_S = 1, x_{-1}, x_{-2}, \dots, x_{-23}$$

Rotunjire

→ spre 0

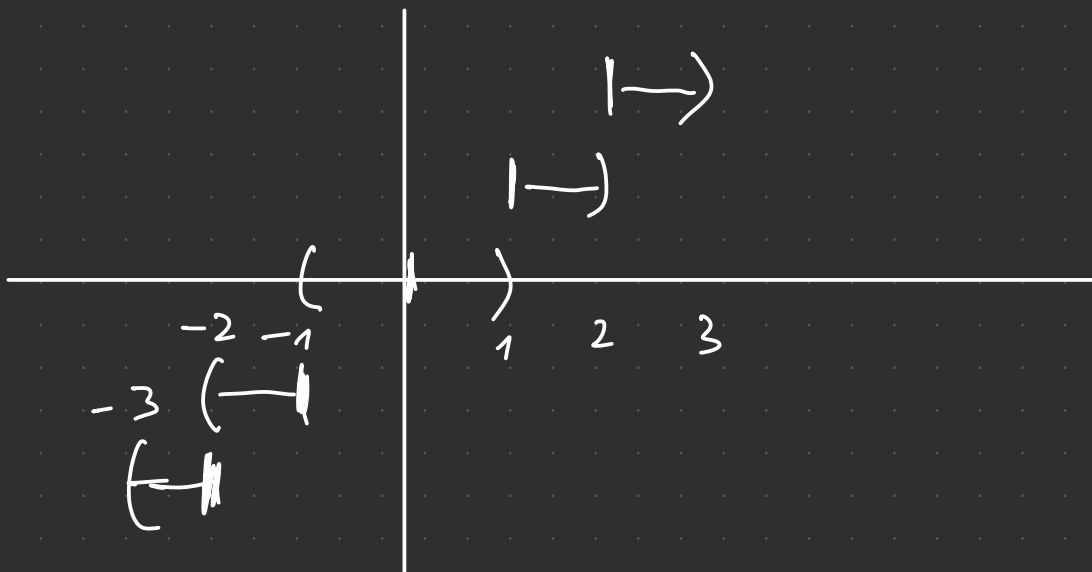
$+\infty$
 $-\infty$
 cel mai apropiat
 m. par

$$X = x_{n-1} \dots x_0 \cdot x_{-1} \dots x_{-m}$$

$x^* \rightarrow$ rotunjit

$$x^* = x_{n-1}^* x_{n-2}^* \dots x_1^* x_0^*$$

(A) Rotunjire spre 0



$$-3.25 = 1011. \cancel{01} = 1011 = \underline{\underline{-3}}$$