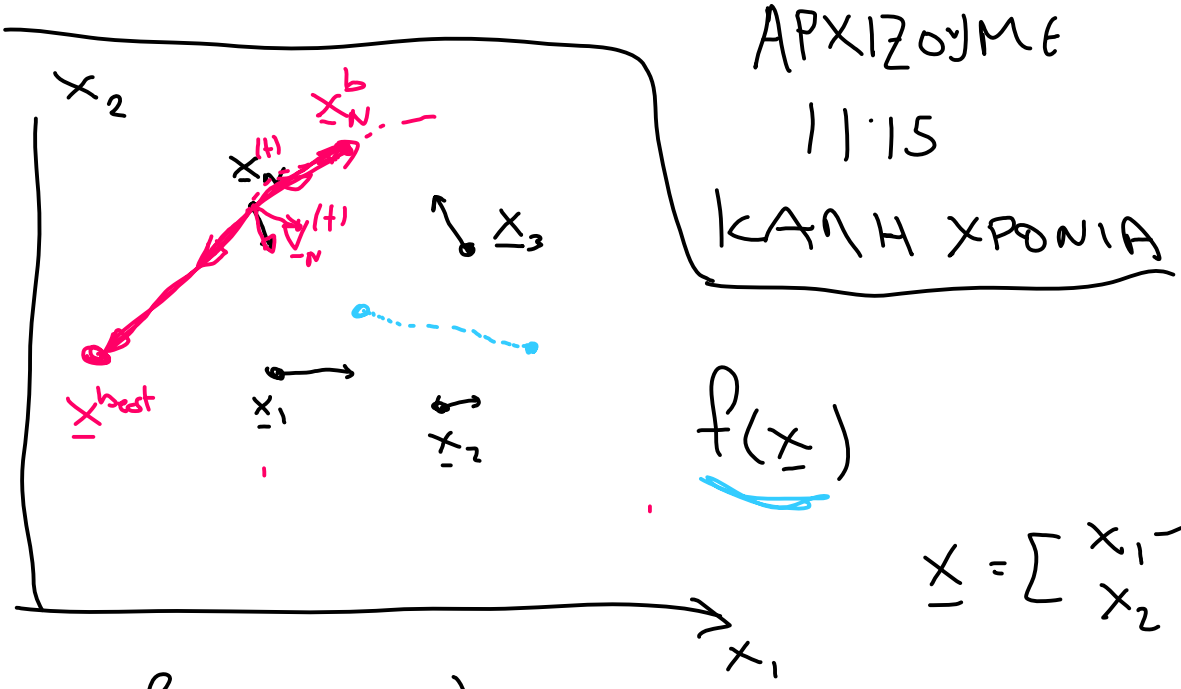
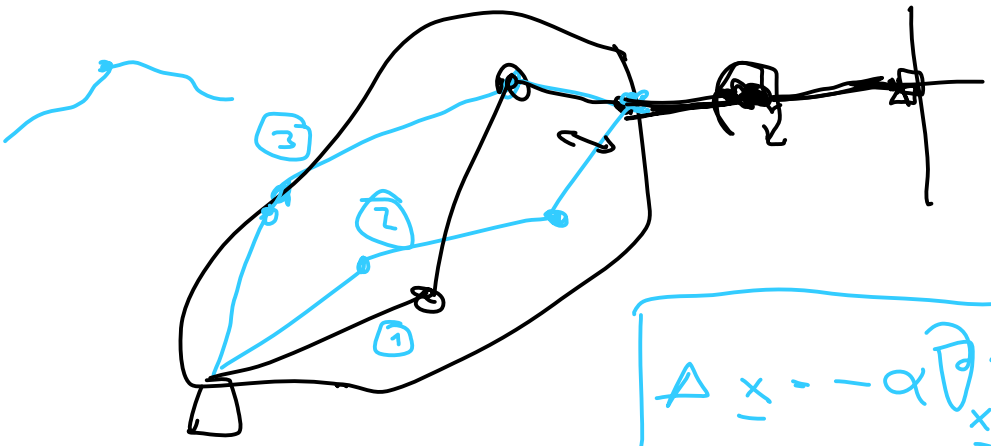
ΑΡΧΙΖΟΥΜΕ
11:15
ΚΑΛΗ ΧΡΟΝΙΑ



$f(\underline{x})$

$\underline{x} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

$f([x_1 \; x_2])$



$$\Delta \underline{x} = -\alpha \nabla_{\underline{x}} f(\underline{x})$$

$$\left[\left(\underline{x}_i^{(t)}, \underline{v}_i^{(t)} \right) \right] \quad \underline{x}_i^{b(t)} \leftarrow \underline{x}_i^{(t)}$$

$$\begin{pmatrix} \underline{x}_1^{(t)}, & \underline{v}_i^{(t)} \end{pmatrix}, \quad \underline{x}_1^{b(t)}$$

$$\begin{pmatrix} \underline{x}_N^{(t)}, & \underline{v}_N^{(t)} \end{pmatrix} \quad \underline{x}_N^{b(t)}$$

$$\left(\underline{X}_N^{(t)} \quad \underline{V}_N\right) \left(\underline{X}_N^{b(t)}\right)$$

$$\gamma(t) = \frac{t}{t}$$

$$\underline{X}^{best(t)} = \min_i \left(\underline{X}_i^{b(t)}\right)$$

$$\underline{V}_i^{(t+1)} = \alpha \underline{V}_i^{(t)} + \beta\left(\underline{X}^{best} - \underline{X}_i\right) + \gamma\left(\underline{X}_i^{b(t)} - \underline{X}_i\right)$$

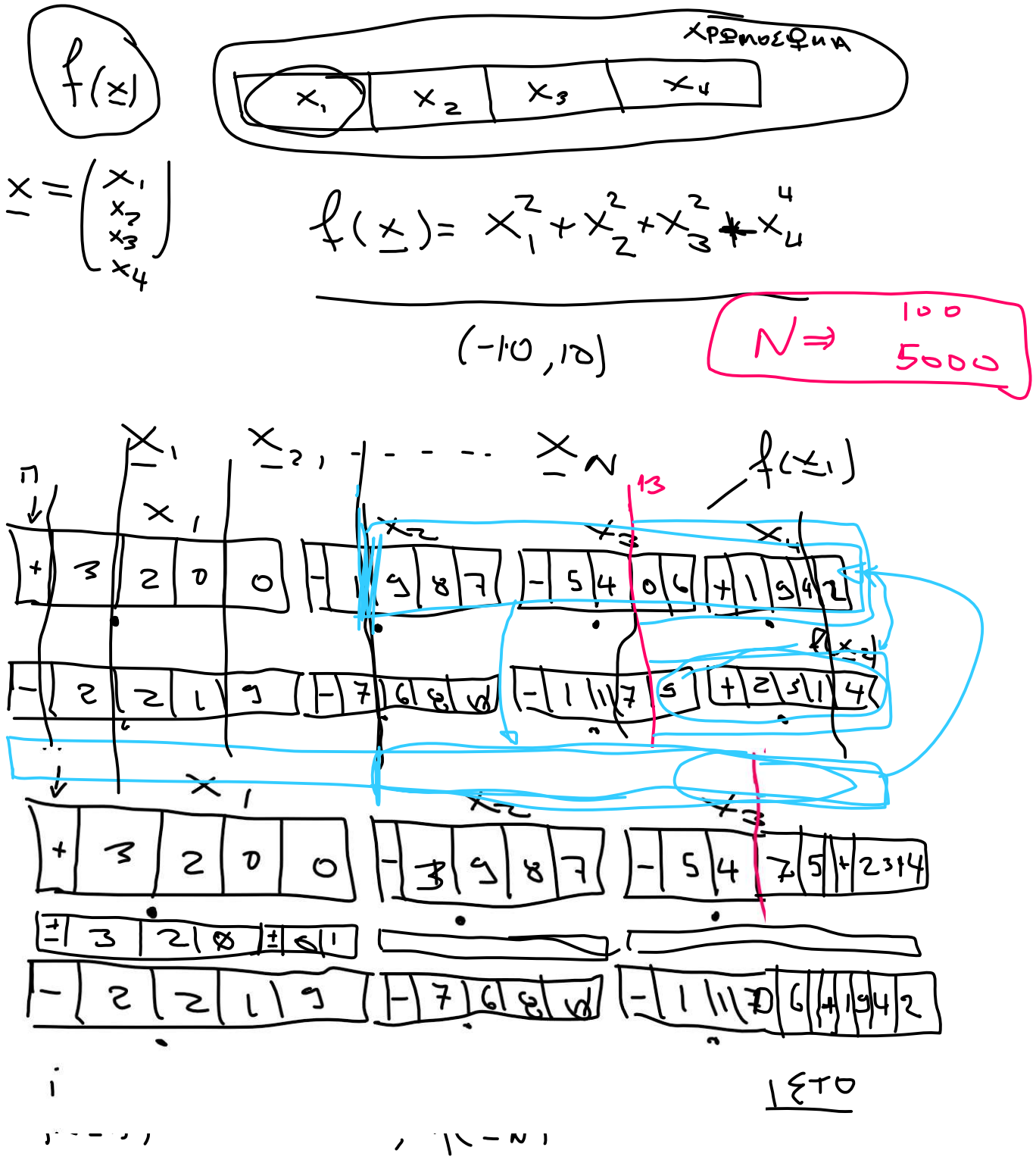
$$\underline{S} = \underline{v} \cdot t \Rightarrow S^{(t+1)} - S^{(t)} = \underline{v}$$

$$\underline{X}_i^{(t+1)} = \underline{X}_i^{(t)} + \underline{V}_i^{(t+1)}$$

$$\text{Av}\ f(x_i^{(t+1)}) < f(x_i^b) \Rightarrow \underline{X}_i^b \leftarrow \underline{X}_i^{(t+1)}$$

$$\text{Av}\ f(\underline{X}_i^{(t+1)}) < f(\underline{X}^{best(t)}) \Rightarrow$$

$$\underline{X}^{best(t)} \leftarrow \underline{X}_i^{(t+1)}$$



① $f_{min} = \min_i f(x_i)$

P(MUTATION) = 0.1
0.05

②

(2) $F(x_1) = f(x_1) - f_{min}, \quad f(x_2) - f_{min}, \quad \dots \quad f(x_N) - f_{min}$

$> 0 \qquad > 0 \qquad > 0$

$F(x_1), \dots, F(x_N) \geq \phi$

(2) $F_\Sigma = \sum_{i=1}^{N} F(x_i)$

$p(x_1) = \frac{F(x_1)}{F_\Sigma}, \dots, p(x_N) = \frac{F(x_N)}{F_\Sigma}$

$\geq 0 \qquad \geq \phi$

$$\sum_{i=1}^{N} p(x_i) = 1$$

(3) $p(\text{MH ANAN}) = \phi 1$

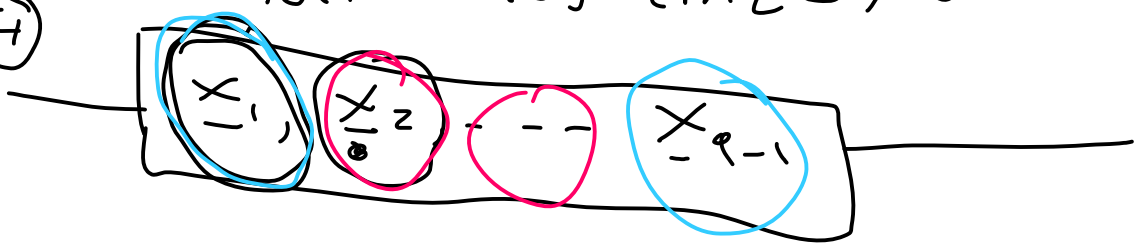
$p(x_1) \geq p(x_2) \geq \dots \geq p(x_{N-1}) \geq p(x_N) = \phi$

$\min_q \sum_{i=q}^{N} p(x_i) \geq p(\text{MH ANAN}) = 0.1$

0.2
0.1
0.05

10 ΝΥΧΤΙΣ ΠΟΥ ΕΠΙΖΟΥΝ

(4)



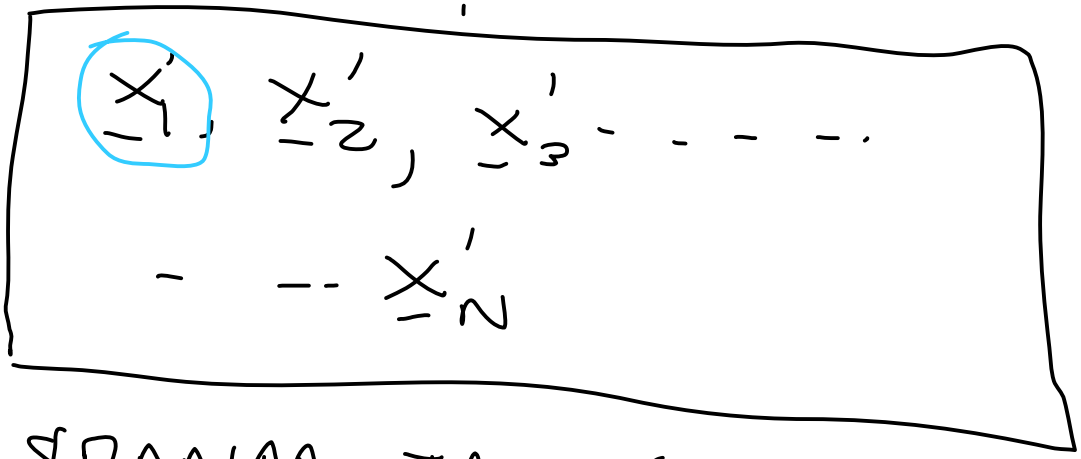
(5) ΑΝΑΠΑΡΑΓ. 2 ΝΕΩΝ ΑΤΟΜΩΝ

(6) ΕΠΙΛΕΓΩ ΔΥΟ ΤΥΧΑΙΟΥΣ ΓΟΝΕΙΣ

(7) ΔΙΑΣΤΑΥΡΩΣΗ → ΠΙΘΑΝΗ ΜΕΤΑΜΑΣΗ.

↓

ΔΥΟ ΝΕΕΣ ΛΥΣΕΙΣ



(8) ΞΑΝΑΠ. ΤΑ 5, 6, 7 ΜΕΧΡΙΣ ΟΤΟΥ ΑΡΙΘΜ. ΤΩΝ ΔΙΑΦΟΡΕΤ. ΛΥΣΕΩΝ ΝΑ ΕΙΝΑΙ N

$$\underline{x}'_i \neq \underline{x}'_j \quad \forall\, i,j = 1,N.\ i \neq j$$

(9) ΕΠΑΝΑΛΑΜΒΑΝΩ ΤΑ (1) → (8) ΜΕΧΡΙ ΕΝΑ ΠΡΟΚΑΘΟΡΙΣΜΕΝΟ ΑΡΙΘΜΟ ΓΕΝΙΩΝ

(10) ΣΤΗΝ ΤΕΛΕΥΤΑΙΑ

ΕΠΙΛΕΓΕΙ ΤΟ $x_q' = \arg\max_i f(x_i')$

$f(x)$ ① ΑΚΡΙΒΕΙΑ ΛΥΣΕΩΝ $\pm$

② ΠΕΔΙΟ ΤΙΜΩΝ $\pm$

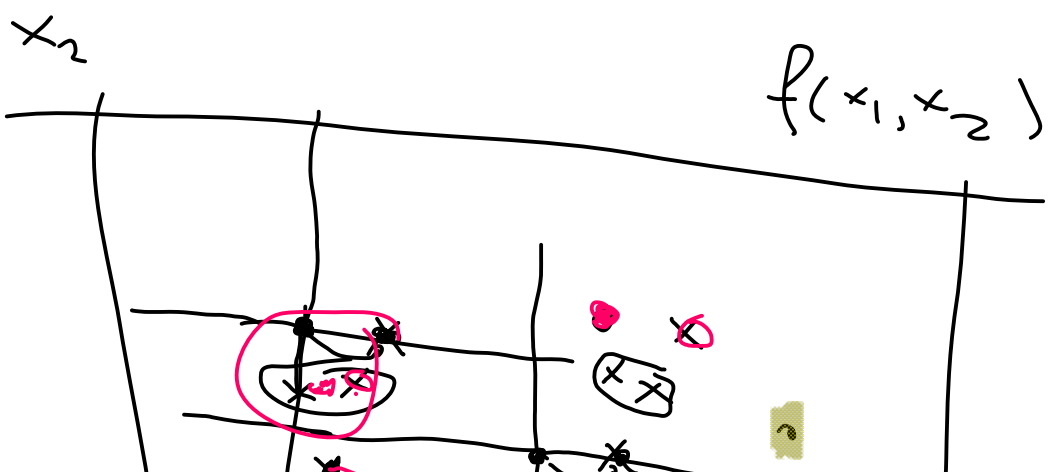
ΜΗΚΟΣ ΧΡΩΜΟΣΩΜΑΤΟΣ

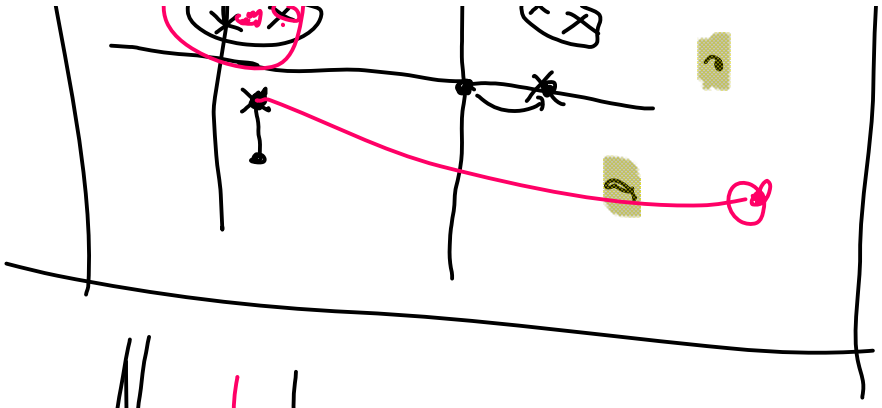
③ ΠΛΗΘΟΣ ΛΥΣΕΩΝ (N)

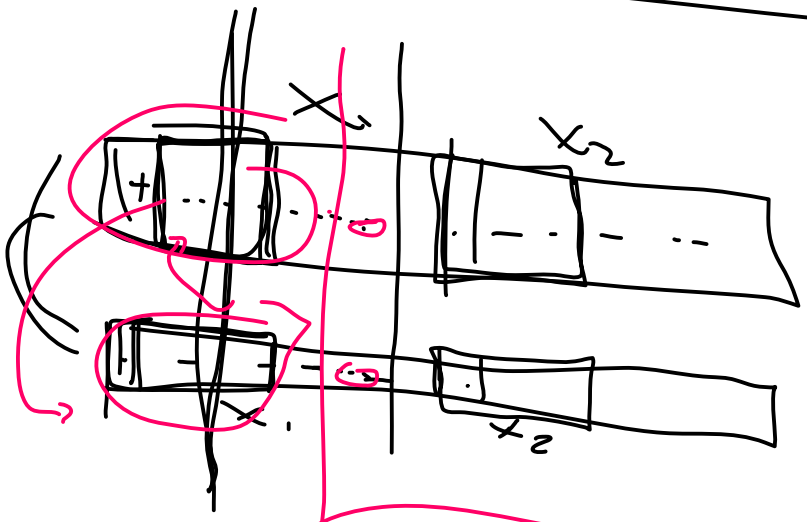
④ -''- ΓΕΝΙΩΝ

⑤ ΠΙΘΑΝ. ΜΗ ΑΝΑΠΑΡ. ν 0.1

⑨ -''- ΜΕΤΑΛΛΑΞΙΑΣ ν 0.1

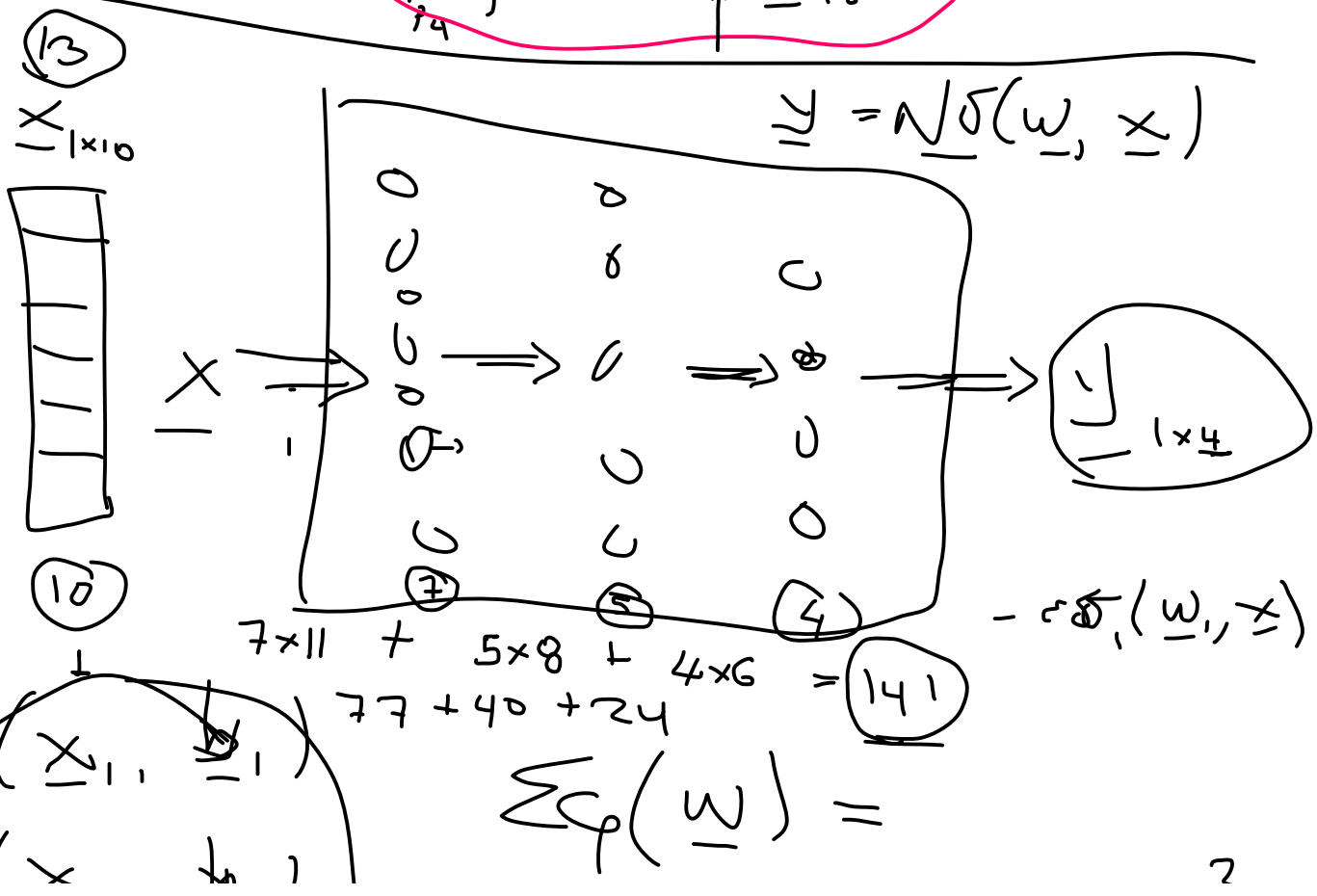






ΑΡΧΙΤΕΚΤΟΝΙΚΕ
11.15

$$\begin{pmatrix} P_1 \\ P_2 \\ P_3 \\ P_4 \end{pmatrix} = f(w_1 x_{13})$$

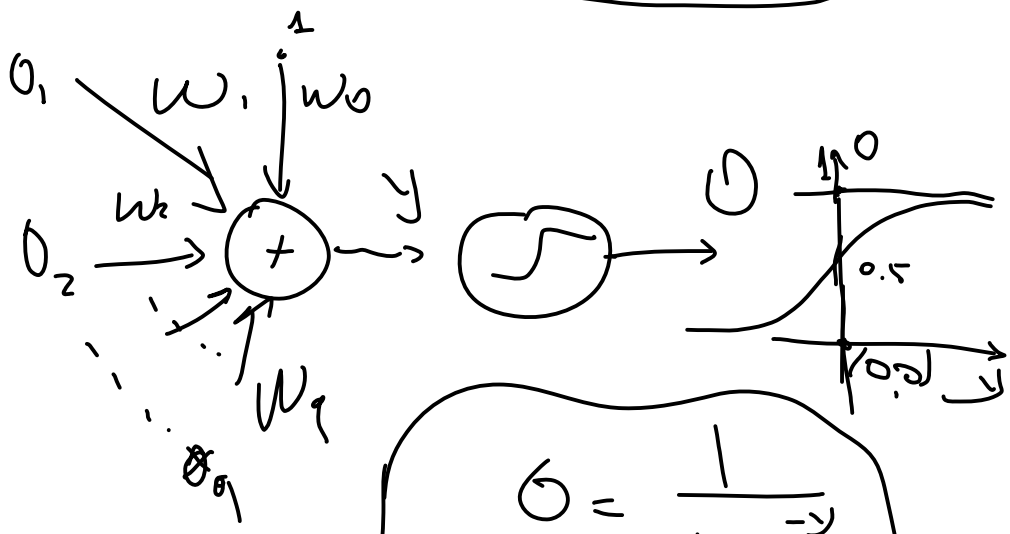


$(\underline{x}_2, \underline{b}_2)$

$\vdots$

$(\underline{x}_N, \underline{b}_N)$

$$\varphi(\underline{w}) = \sum_{i=1}^{N} \| \underline{f}(\underline{w}, \underline{x}_i) - \underline{b}_i \|^2 \geq 0$$



$$O = \frac{1}{1+e^{-y}}$$

$$y = \sum_{i=1}^{q} w_i O_i$$

$w = (-1, 1)$

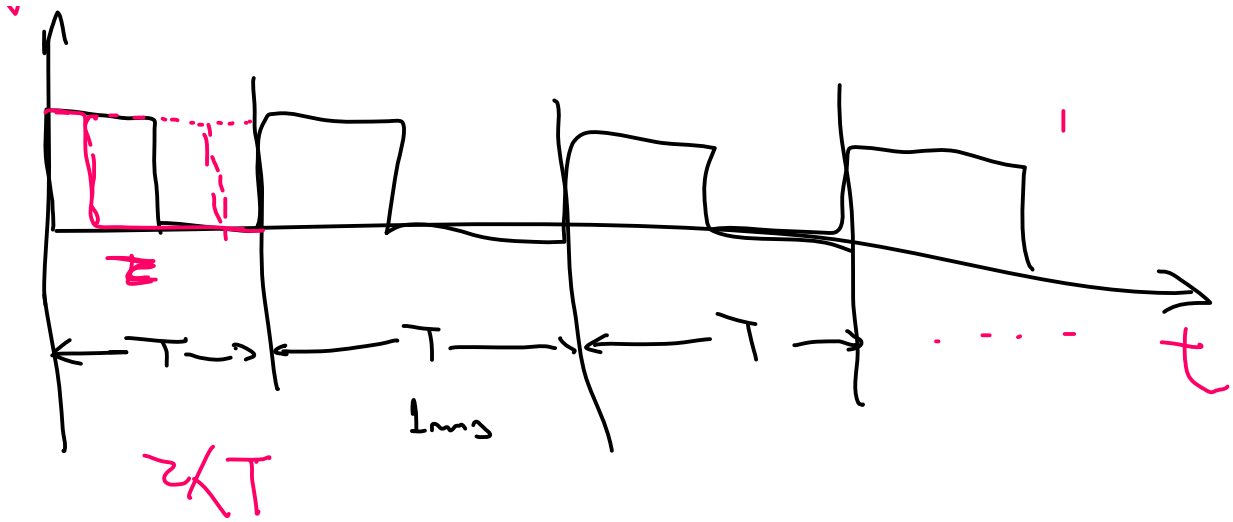
↳ ΜΕ 9 ΔΕΚΑΔΙΚΑ ΨΗΦΙΑ

$10 \times 141 = 1410$ ΚΕΛΙΑ

±	2	1	4	6	9	0	4	2	8						

0.2146904728

$$f(\underline{w}) = -\varphi(\underline{w})$$



12:25

$$\underline{y} = \underline{f}(\underline{w}, \underline{x})$$

Koza · genetic programming

$x, y, z \longrightarrow V$

$V = x + y + z$

$V = \underline{f}(x, y, z)$

1, 1, 1 → 1

1 2 1 → 2

2 2 3 → 12

$V =$ —