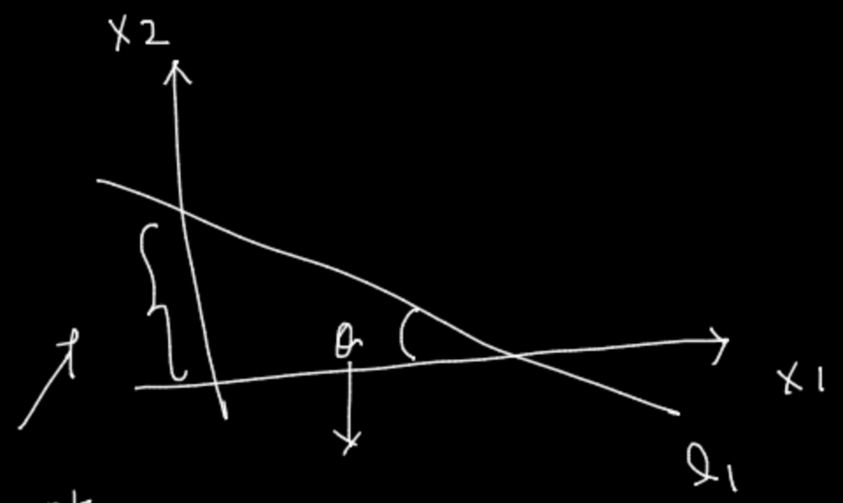
Line

2D

$y = mx + c$

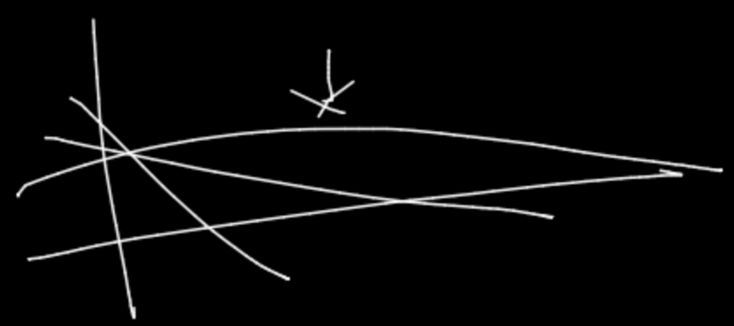
slope y intercept

→



$m = \tan\theta$

2D



$ax + by + c = 0$ ← 2D → $w_1 x_1 + w_2 x_2 + w_0 = 0$

$by = -ax - c$

$y = -\frac{a}{b}x - \frac{c}{b}$

m

c

eq. de la droite (2D)

x_2

x_1

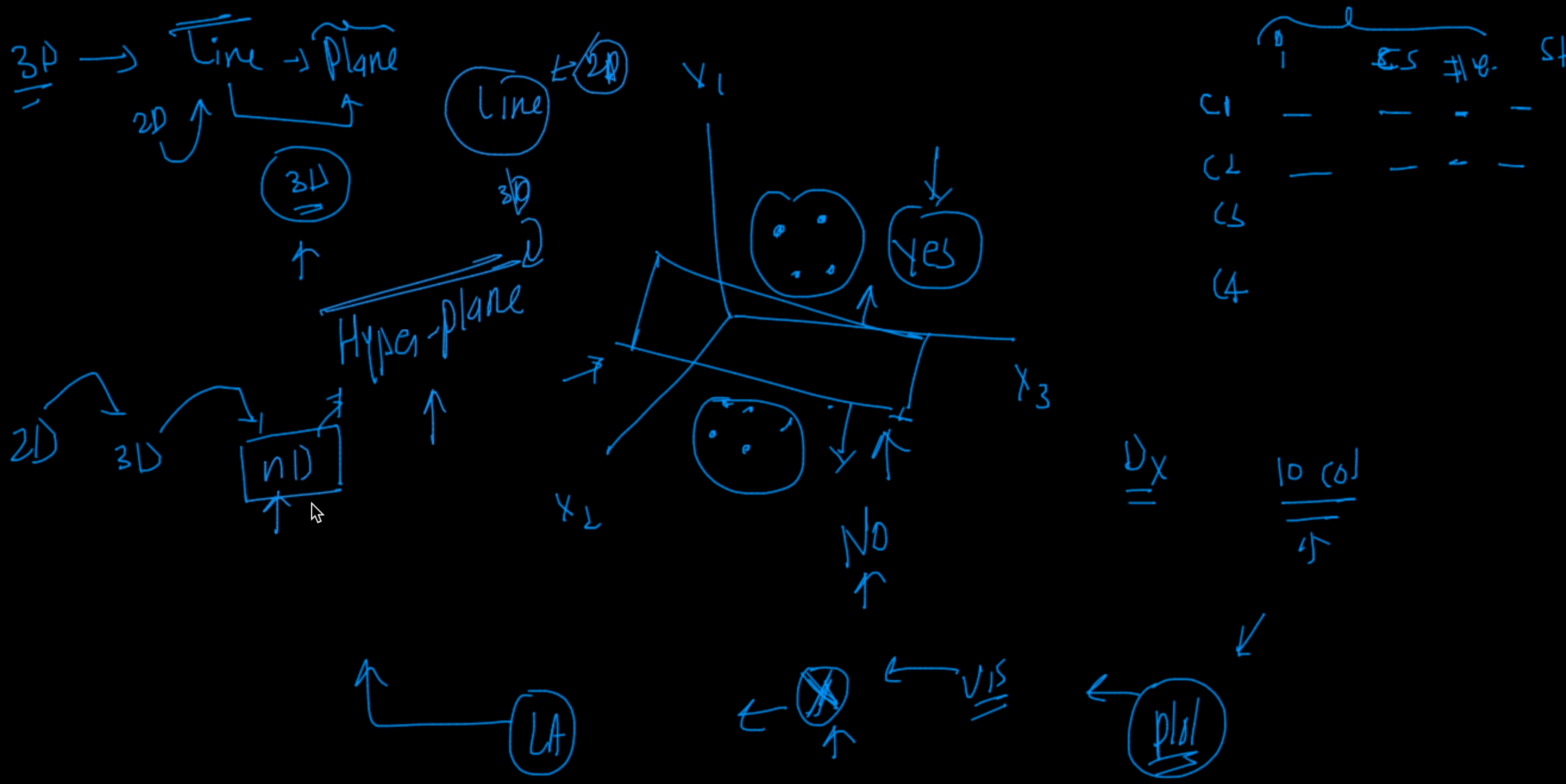
(x_1, x_2)

$w_1 =$

$w_2 =$

$w_0 =$ → ?

paramètres →



3D
Line
Plane
2D
3D
Line
2D
3D
Hyper-plane
2D
3D
nD
Y_1
X_3
X_2
Yes
No
C1
C2
C3
C4
Dx
10 col
LA
VIS
plot

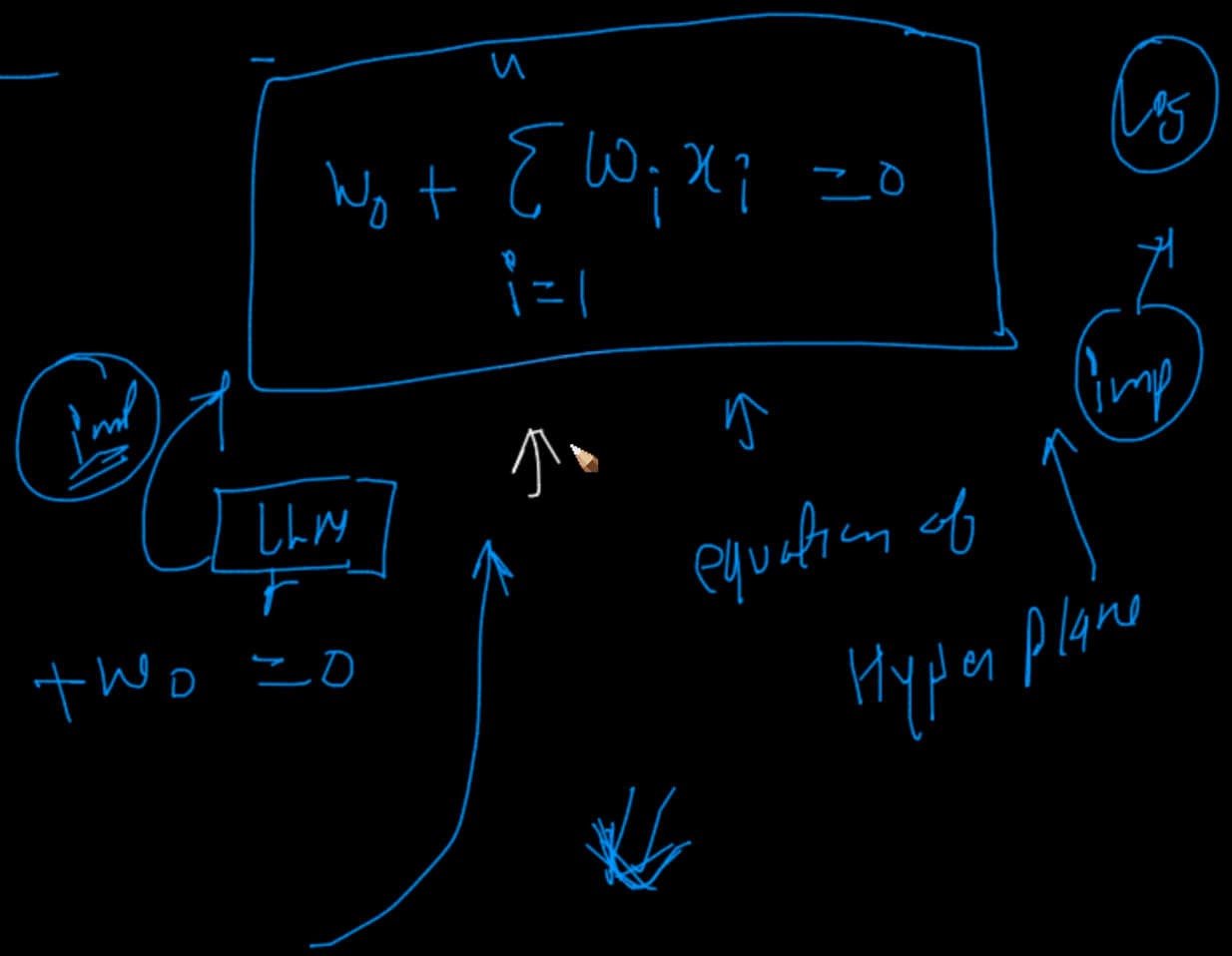
equation of line

X1 X2

2D

$$w_1 x_1 + w_2 x_2 + w_0 = 0$$

$$w_0 + \sum_{i=1}^{n} w_i x_i = 0$$



3D

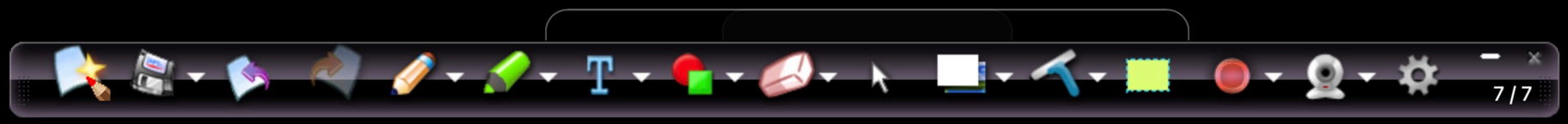
$$w_1 x_1 + w_2 x_2 + w_3 x_3 + w_0 = 0$$

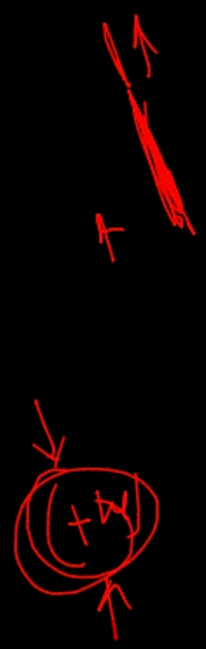
nD

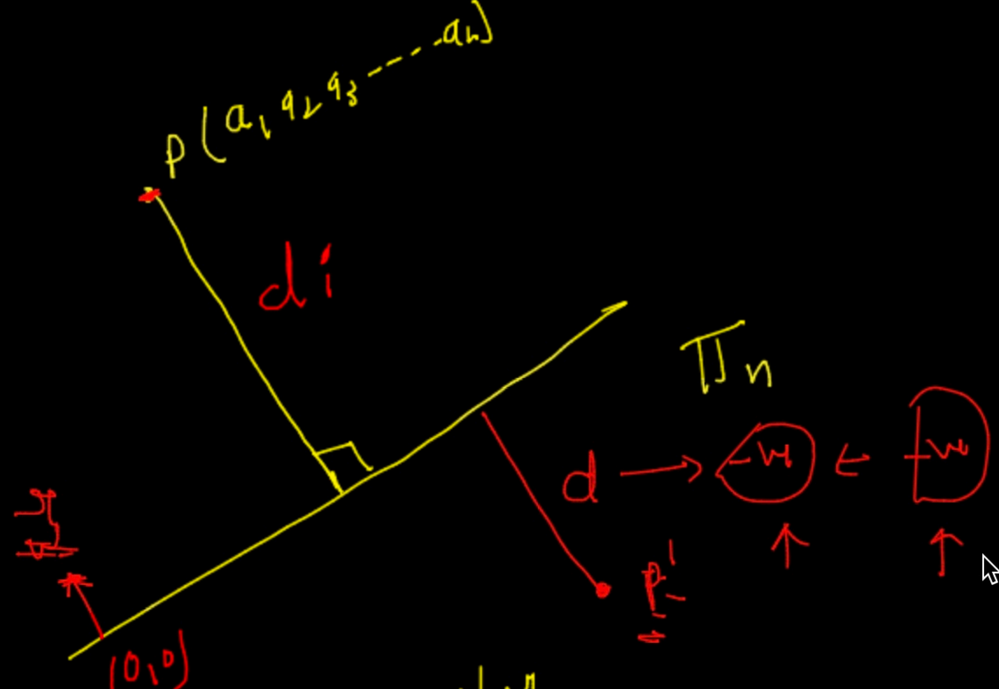
$$w_1 x_1 + w_2 x_2 + w_3 x_3 + \cdots + w_n x_n + w_0 = 0$$

eg.
Historical data
x
income
credit-score
y
Status
C1 14 750 Yes
C2 13 760 Yes
C3 14 790 Yes
C4 6 350 NO
C5 7 340 No
low
close
plot it
5 test
$w_1 x_1 + w_2 x_2 + w_0 = 0$
$0.4 * 8 + 0.3 * 390 + (-1.9)$
550
+ve
(-ve) value
Rule
if $w_0 x_1 < 0$
NO
Best
Line
Yes
No
conf
income
C_6 [8, 390]
C_7 [11, 550]
$W_1 =$
$W_2 =$
$W_0 =$

5 / 6


7 / 7

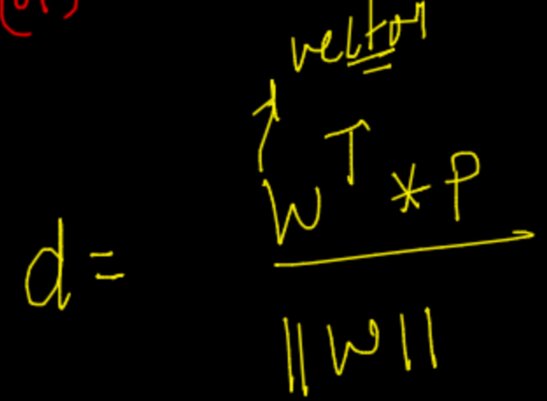



p(a1 a2 a3 ---- an)
di
(0,0)
d

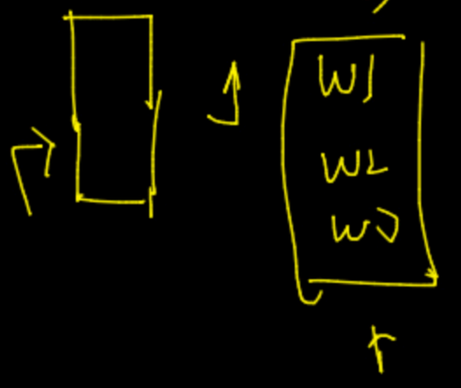
Tn
d
w
w
p'


Y=w1x1+w2x2+wo

eg.
dx
w1
wb
f1
f2
Y
Y=17*w1+26*wb+w0
[17, 72]
output


weight
wT*p
d=
||w||


w1
w2
w0


w1
w2
w3

feature/col/input

f_1 f_2 f_3 --- f_n Y

[- - - - - - - -]

obtaining → Dx 1

w_1
w_2
⋮
w_n

w_1 w_2 w_3 ⋮ w_n + w_0

(1 x n)

transpose

at time

cost no

input → X

x_1 x_1]

[- - - - - - - - -]

(n x 1)

W . X

(1 x n)

$w^* = [w_1\ w_2\ \cdots\ w_n]_{1\times n}$ — "weight" vector

$X = [x_1\ x_2\ \cdots\ x_n]_{1\times n}$

$\begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix}_{n\times 1}$

$Y = \sum_{i=1}^{n} w \cdot X + w_0$

sklearn

sgmd

(A) $m \times n$

(B) $n \times p$

sgmd 1개

$(w)_{n\times 1}\ (X)_{1\times n} \rightarrow (n\times n)$

$\Downarrow$

ε

$(A)_{m\times n}\ (B)_{n\times p}$

$\Downarrow$

$(C)_{m\times p}$

$[w_1, w_2]$ $[3, 2]$ $w_1 = 2.3$

$[0.1, 0.2]$

vector

$\begin{bmatrix} 0.1 \\ 0.2 \end{bmatrix}$ $[3, 2]$ $= 0$ → sum $\left(\begin{bmatrix} 0.1 \times 3 & 0.2 \\ 0.3 & 0.2 \end{bmatrix} \right)$

2×1 1×2

$[0.1 * 3 + 0.2 * 2]$ + bias

add all △ $w_1 | w_2$ $w_1 | w_2$

[0.2, 0.3, 0.4]

[x1 x2 x3]

(1, 2, 1)

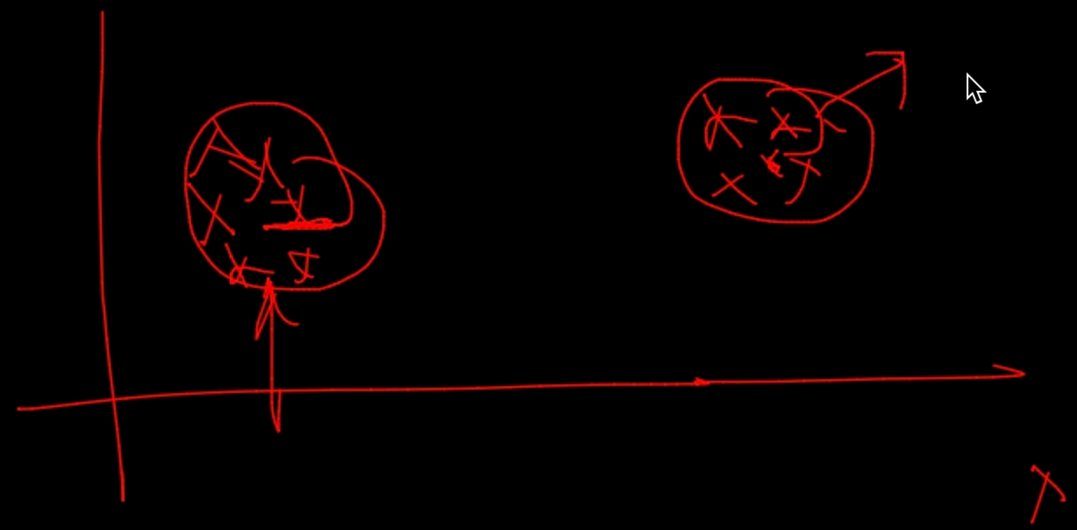
Log Regression

0.2 *

cross product x

dot product

0.2 * 1 + 0.3 x



ABL

$\mu = 1$