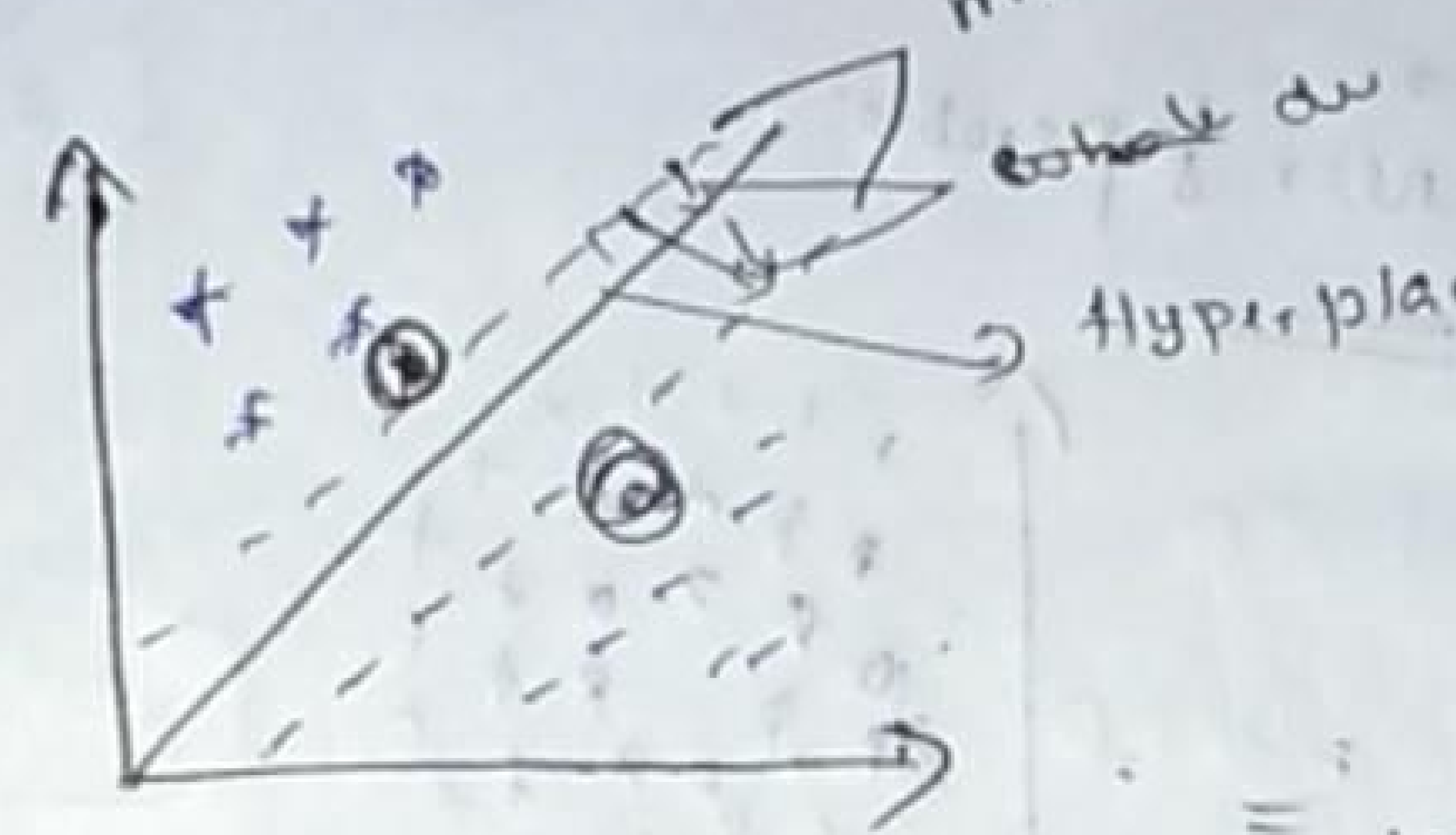
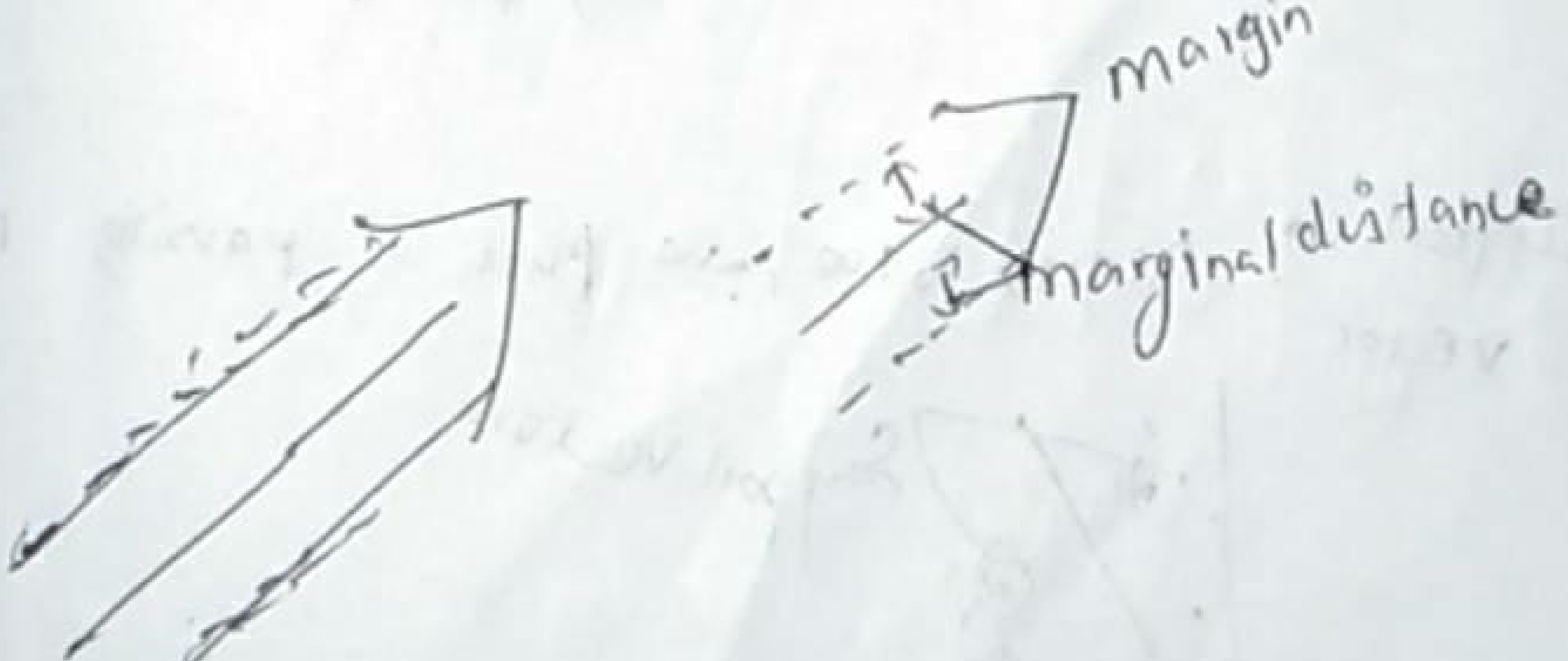
Support Vector machine

1. Support Vector
2. Hyper planes → 2d-straight line, 3d > → hyperplane
3. Marginal distance → 2 parallel lines are crea[te] respect near +ve -ve. distance b/w them (margin)
4. Linear separable → linearly line sep.
5. Non-linear separable



After create hyperplane create 2 parallel plane one is dot other is dot (margin)

One of Nearest (+ve or -ve)



aim: maximum margin plane

which has maximum plane (margin plane)

Linear separable:-

linear straight actually

linearly classify

non-linear seperable:

2d-line
3d-hyperplane

=) we can't draw straight line

=) however
↳ reference

Support vector: nearest to the line that is passing margin

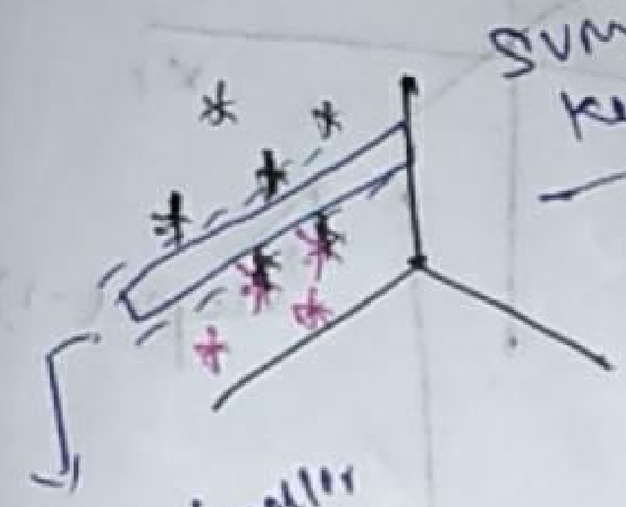
How to solve Non-linear:

SVM technique is SVM kernel

↓

Low dim to high

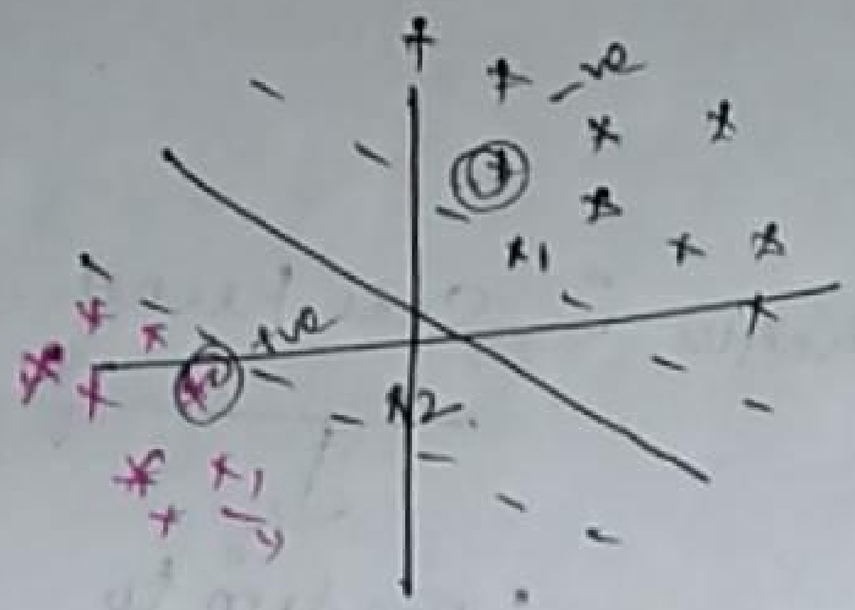
2D - 3D.



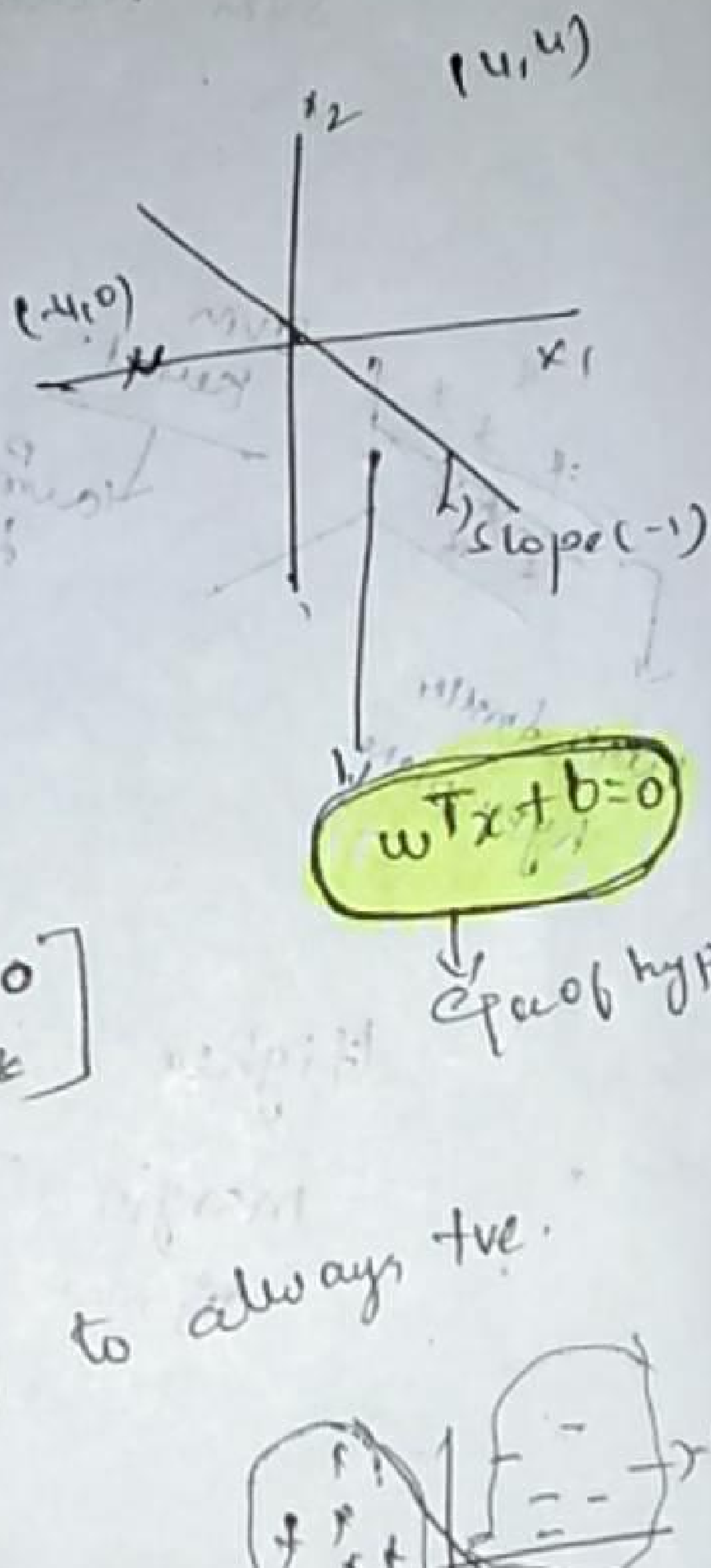
↓

Higher margin → more generalized model.

Math intuition sum



OR



-ve ($w^T x + b = -1$)

+ve ($w^T x + b = +1$)

Calculate y value:

m = -1

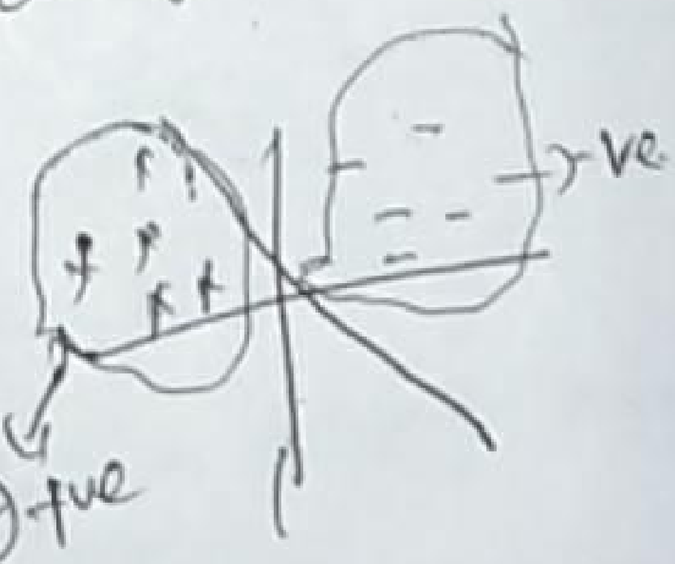
c or b = 0

$y = w^T x + 0$

$$\Rightarrow \begin{bmatrix} -1 \\ 0 \end{bmatrix} \begin{bmatrix} -4 & 0 \\ 4 & 4 \end{bmatrix}$$

$= 4$ (+ve)

↳ going to always +ve.



$$\Rightarrow \begin{bmatrix} -1 \\ 0 \end{bmatrix} \begin{bmatrix} 4, 4 \end{bmatrix}$$

$= -4$ ||.

↳ going to negative

$w^T x_1 + b = -1$

$w^T x_2 + b = +1$

$(x_2 - x_1)$

$w^T x_1 + b = -1$

$(2)\ w^T x_2 + b = 1$

$w^T (x_2 - x_1) = 2$

Remove help of norm $|\vec{w}|$

$$\frac{w^T}{||w||} (x_2 - x_1) = \frac{2}{||w||}$$

optimize function

we need to maximize

$$\text{update}(\vec{w}, b) = \max \frac{2}{||w||}$$

Such that

$$y_i \begin{cases} 1 & w^T x + b \geq 1 \\ -1 & w^T x + b \leq -1 \end{cases}$$

Scanned by TapScanner

instead previous line

$$y_i * w^T x_i + b_i \geq 1$$

That is not >1 that is misclassify.

apart add 2 terminology

$$w*b^* = \min \frac{\|w\|}{2} + C_i \sum_{i=1}^{n} \text{getaj}$$

(minimize distance)

how get (Hyperparameter tuning)

(Regularization)

How many errors my model.

Summation (Value of error)

Error = c - misclassified points

Value distance b/w them

errors

then get sum of errors

Svm

$$w^* b^* = \min \frac{\|w\|}{2} + C_i \sum_{i=1}^{n} \xi \text{getaj}$$