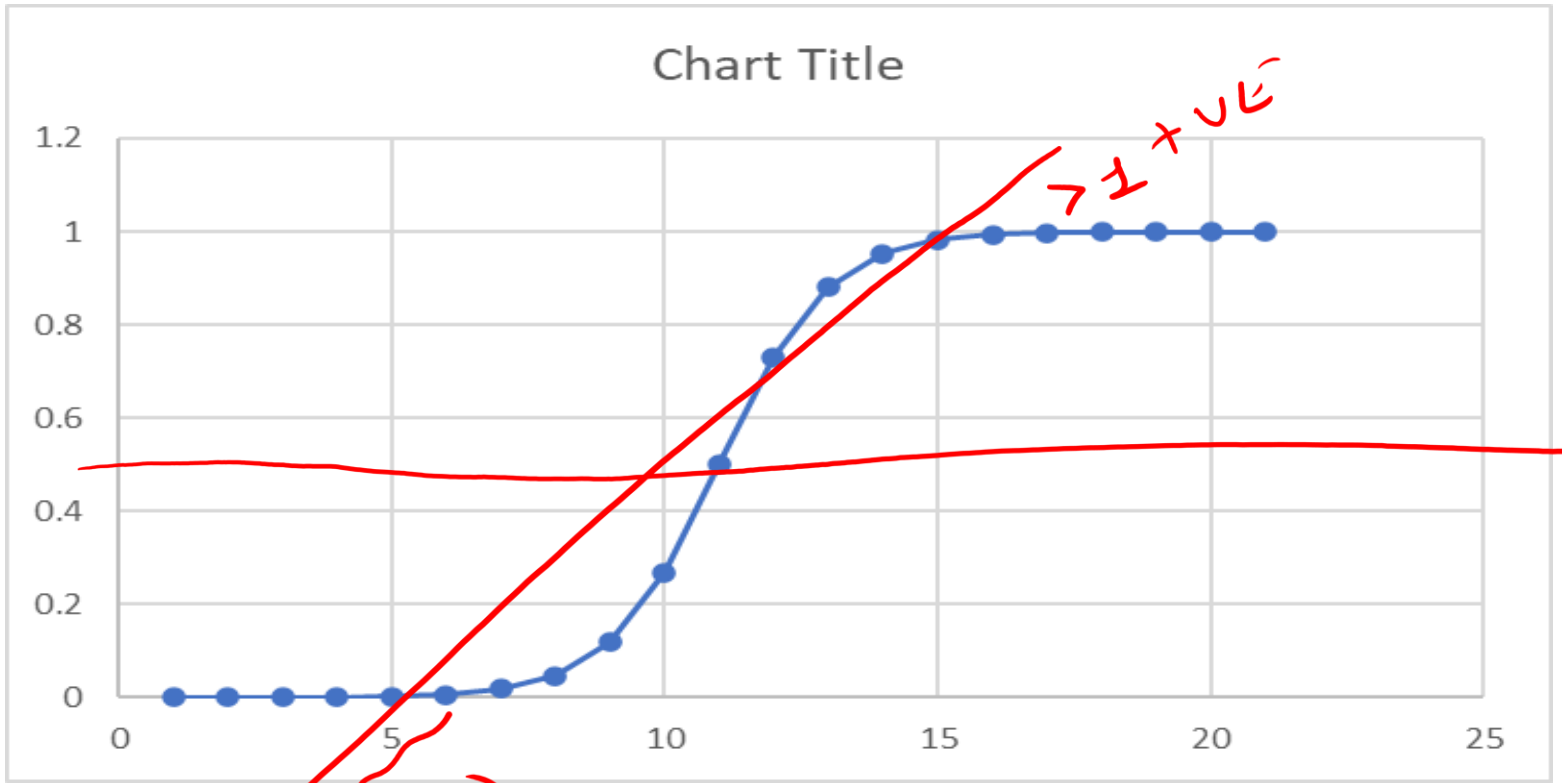
AGENDA – DAY 5 – 29-NOV-2025 (SAT)

- REACP – DAY 4 + DOUBT CLEARING – MAX 10 MINUTES

- DAY 5
  - Supervised Classification
    - Logistic Regression
    - Naive Bayes' Classifier
    - KNN
    - Decision Tree
- Q & A
- SUMMARY, HEADS-UP FOR DAY 6 & CLOSURE

REACP – DAY 4 + DOUBT CLEARING – MAX 10 MINUTES

- L1 & L2
- Confusion matrix, Alpha lamda
- Conditional probability
- Accuracy
- Classification and Types
- lasso ridge and elastic Net
- Sigmoid curve
- True positive rate and false positive rate



SUCCESS

(Y = 1)

DEF

$P(Y=1 \mid x_1, \ldots x_n)$

≥ 1 +VE

≥ 0.5

< 0.5

-VE

$\rightarrow [0, 1]$

0 $P(Y=0 \mid x_1, x_2 \ldots$

	TRUE LABEL	PRED PROB FOR MALIGNANT	MODEL PRED	DEF THRESHOLD	0.5	RULE: MALIGNANT IF PRED PROB >= 0.5
1	B	0.1	**B**			
2	B	0.25	**B**			
3	B	0.4	**B**			
4	B	0.6	**M**	FP	2	
5	B	0.8	**M**	FP		
6	M	0.35	**B**	FN	1	
7	M	0.55	**M**			
8	M	0.7	**M**			
9	M	0.85	**M**			
10	M	0.95	**M**			

CM [TH = 0.5]

[TN = 3 FP = 2
FN = 1 TP = 4]

TH = 0.37

P >= 0.37

Naive Bayes Classifier

- Extension of conditional probability
- Revise the previously computed probability based on the new information available

POSTERIOR PROB = COND PROB * PRIOR PROB / EVIDENCE

Y=1 → MALIGNANT → PEPE NOT A FLASH (1)

$$P(Y=1|X..) = \frac{P(X|Y=1) * P(Y=1)}{P(X|Y=1) * P(Y=1) + P(X|Y=0) * P(Y=0)}$$

PROB OF DETECTING POINT TO BE MALIGNANT

(1) GIVEN INFORM IN IND VARIABLES.

NB

1) PRIOR PROB → TOSSING A FAIR COIN
P(H) = P(T) = 0.50

2) ADDITIONAL INFORMN

3) POSTERIOR PROB ✓

PRIOR PROB ← P(Y = 1) WITHOUT ANY OTHER INFORMN

> 10%

12%

IDEAS → HISTORICAL DATA.

→ BANK LOAN

PERSON → "ABC" → BANK → SBI, SAL, DIEL, ECT, LAT, TEN, CR, SDL LOAN

BANK MGR → "XYZ" → SDL LOAN

← BANK → 10%

→ 0.10 OR 10% → PRIOR PROB

PRIOR PROB

$P(Y = 1)$ → WITHOUT ANY INFO ABOUT

$Y = 1$ → MALIGNANT ✓

→ DEFAULT ✓

$P(Y = 1 \mid x_1, x_2, \ldots x_k)$

→ POSTERIOR PROB

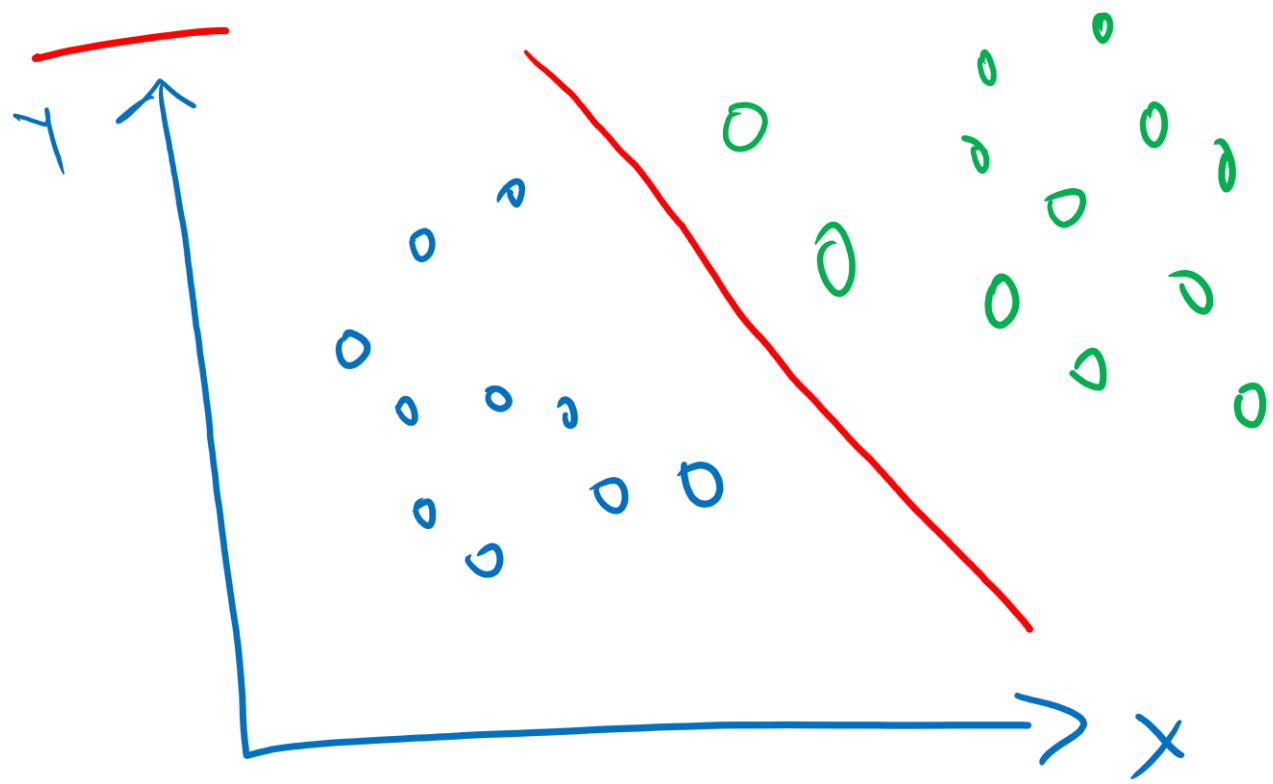
INDIAN POPLN: ANY PERSON ↓ PAST DATA.

→ $P(\text{PER} = \text{HYPERTENSIVE}) = 0.20$ ✓

↓ BELIEF

→ PERSON → "XYZ" ✓ → ....

SVM:



O → CLASS B

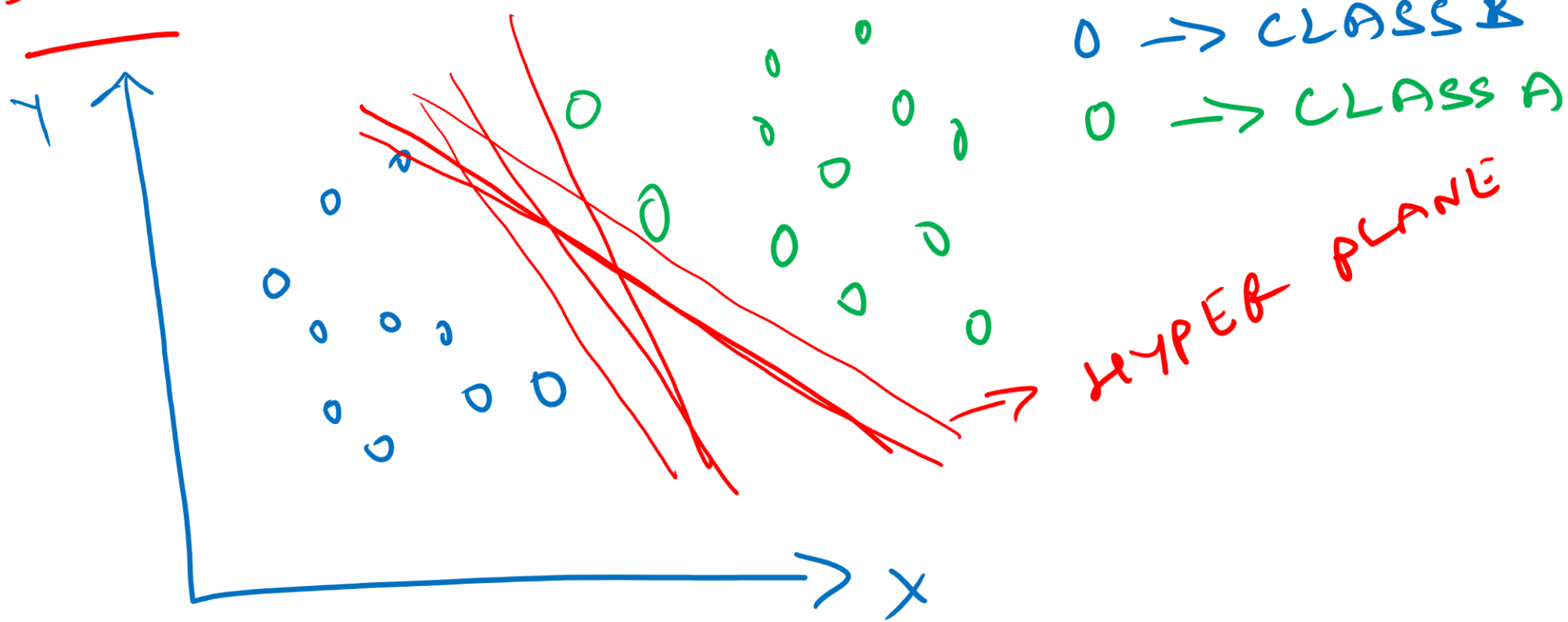
O → CLASS A

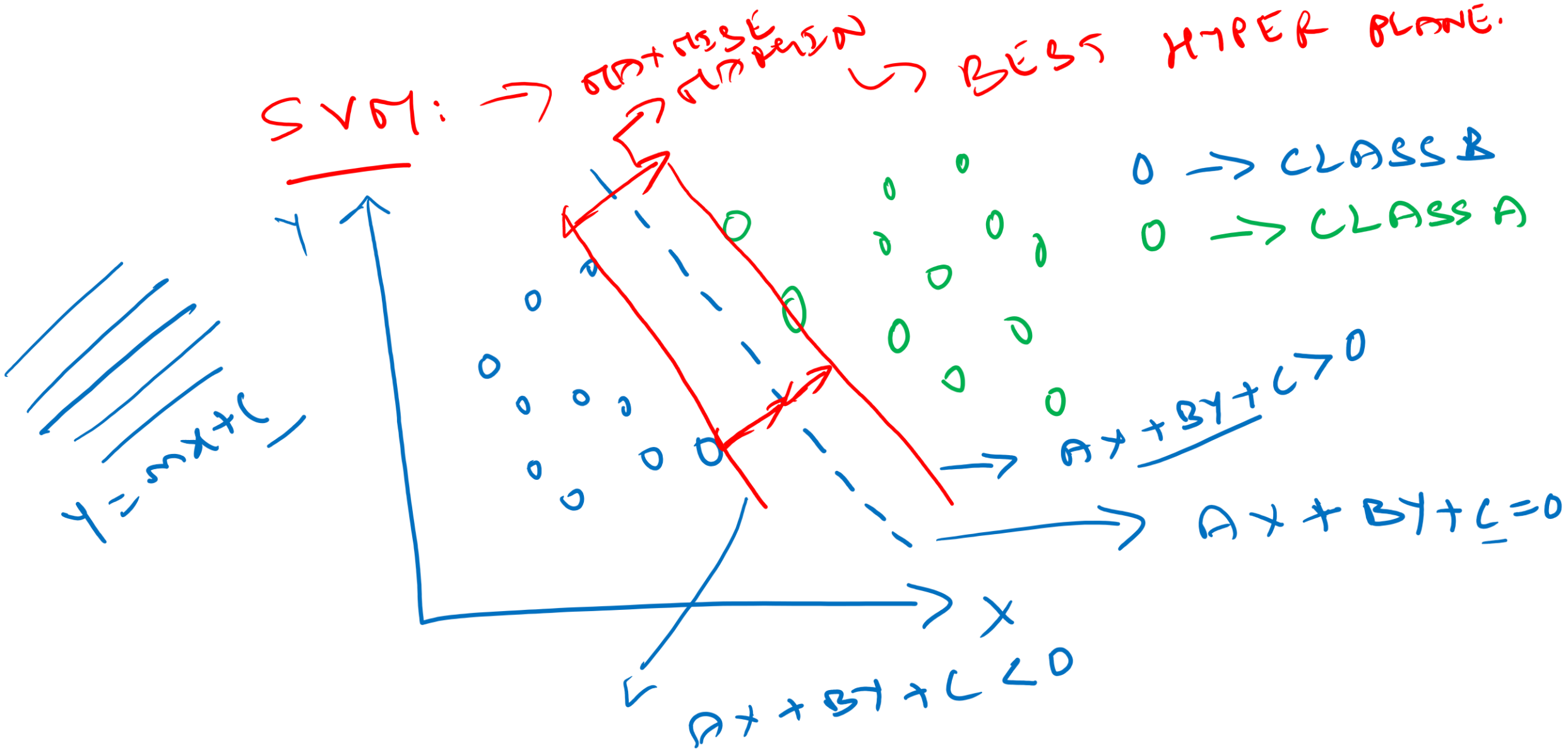
PLANE → 3

HYPER PLANE

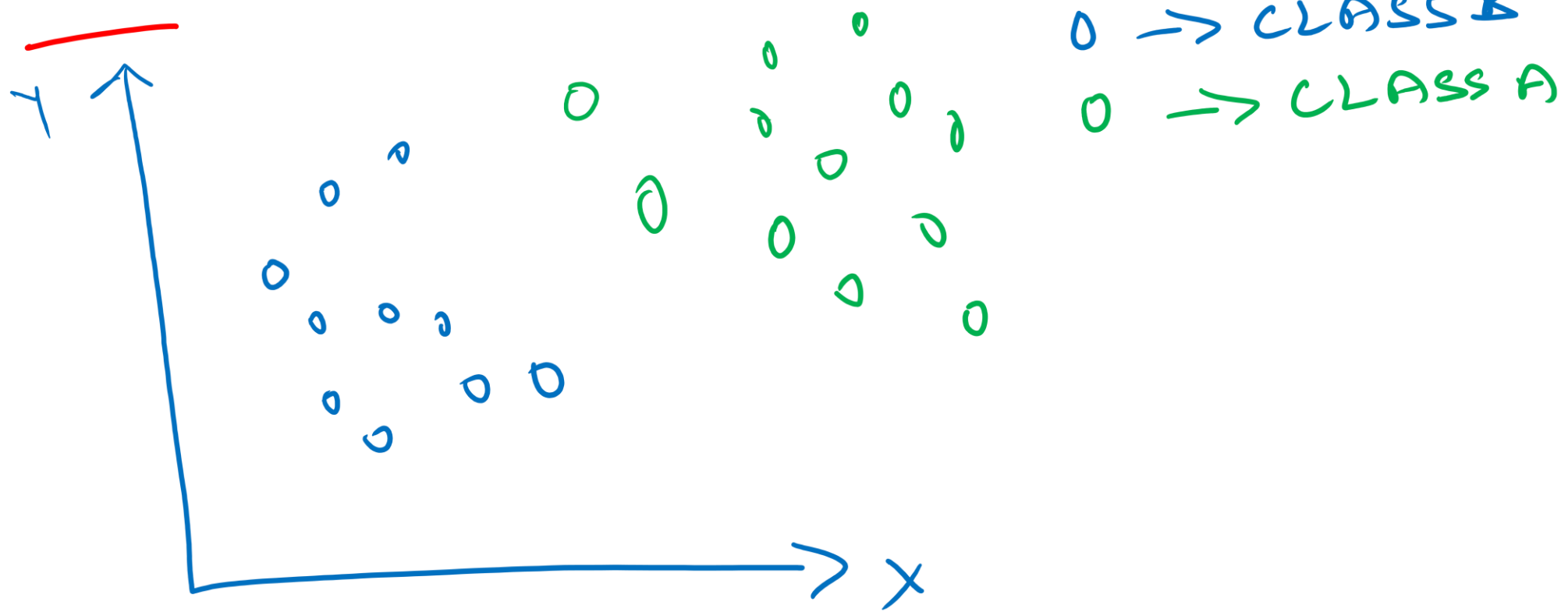
> 3 DIM

SVM:

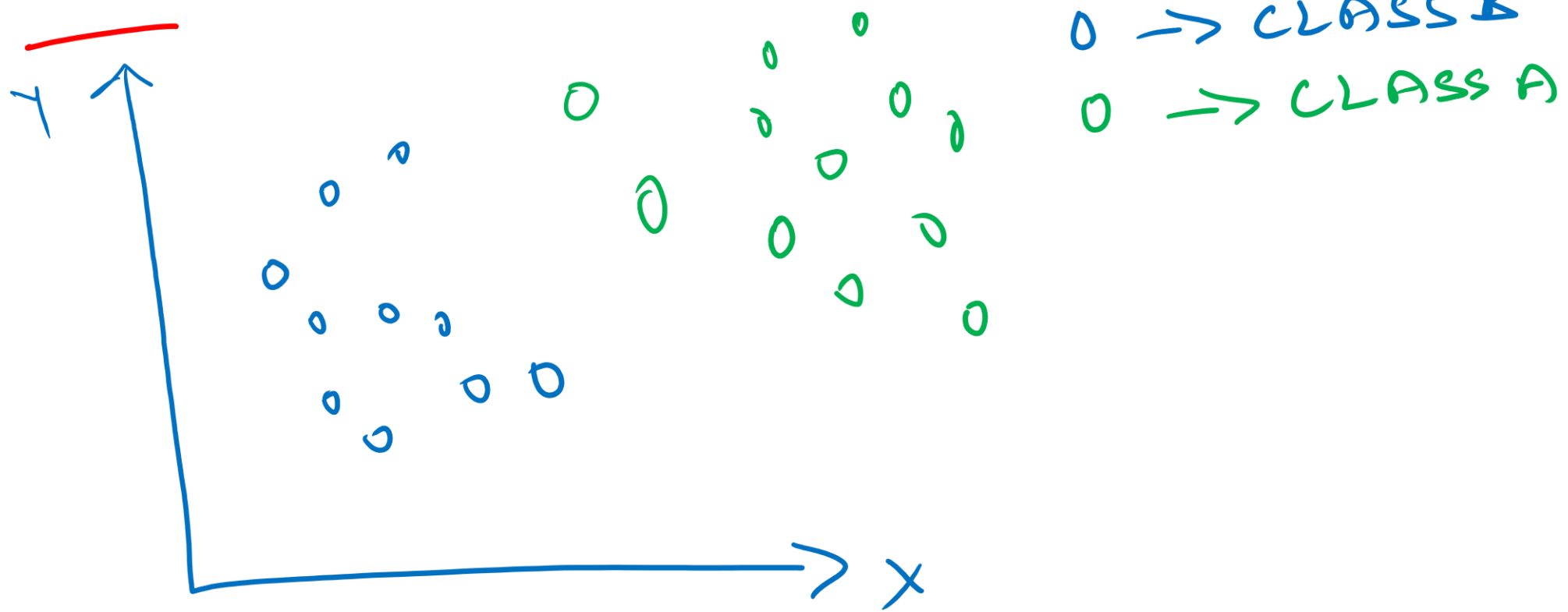


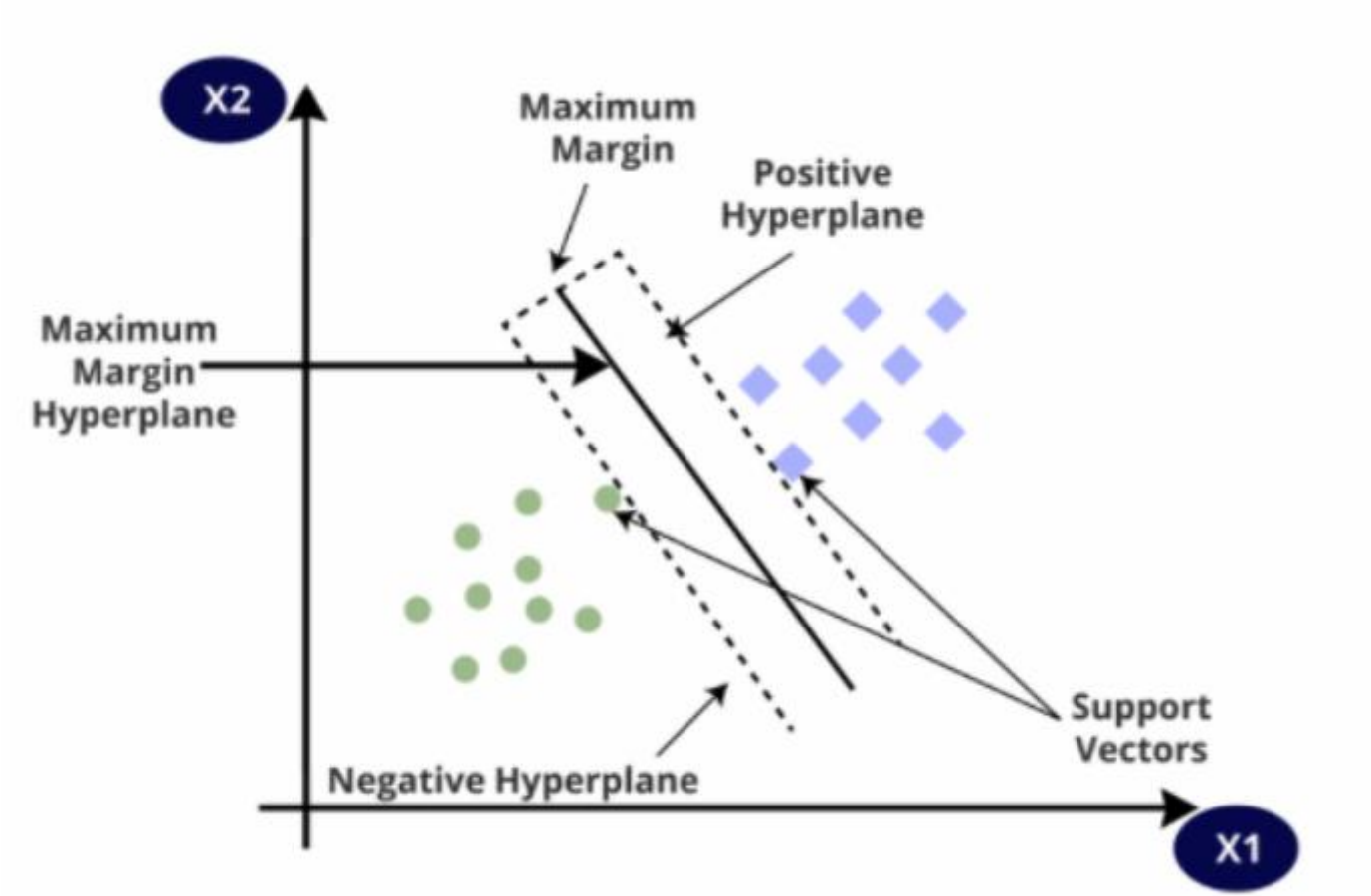

SVM: → OPTIMISE HYPERPLANE
↳ BEST HYPER PLANE.
Y
X
Y = mx + c
0 → CLASS B
0 → CLASS A
Ax + By + c > 0
Ax + By + c = 0
Ax + By + c < 0

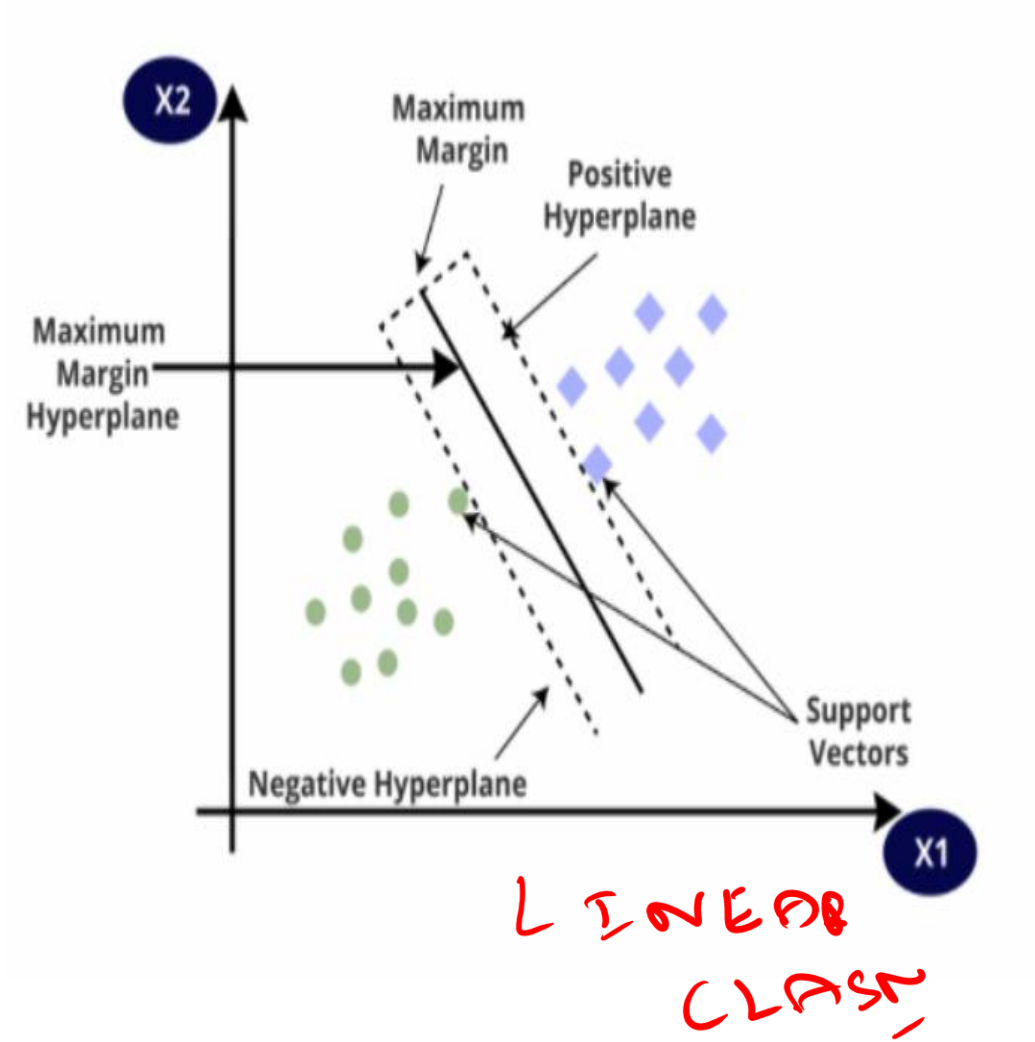
SVM:



SVM:

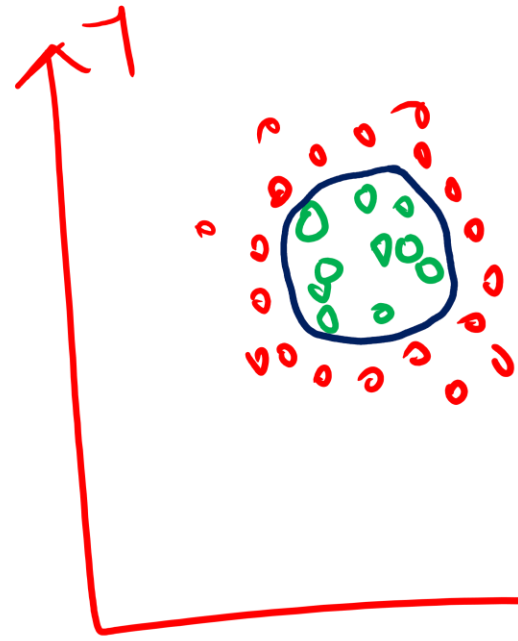



X2
Maximum
Margin
Positive
Hyperplane
Maximum
Margin
Hyperplane
Support
Vectors
Negative Hyperplane
X1

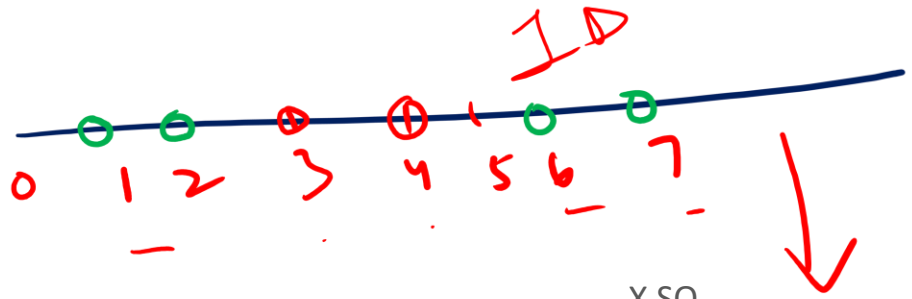


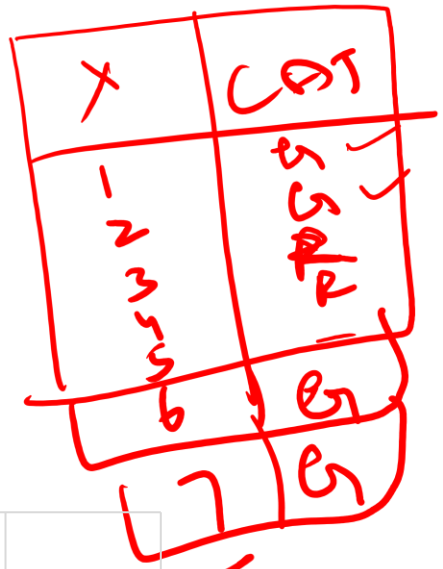
LINEAR CLASS

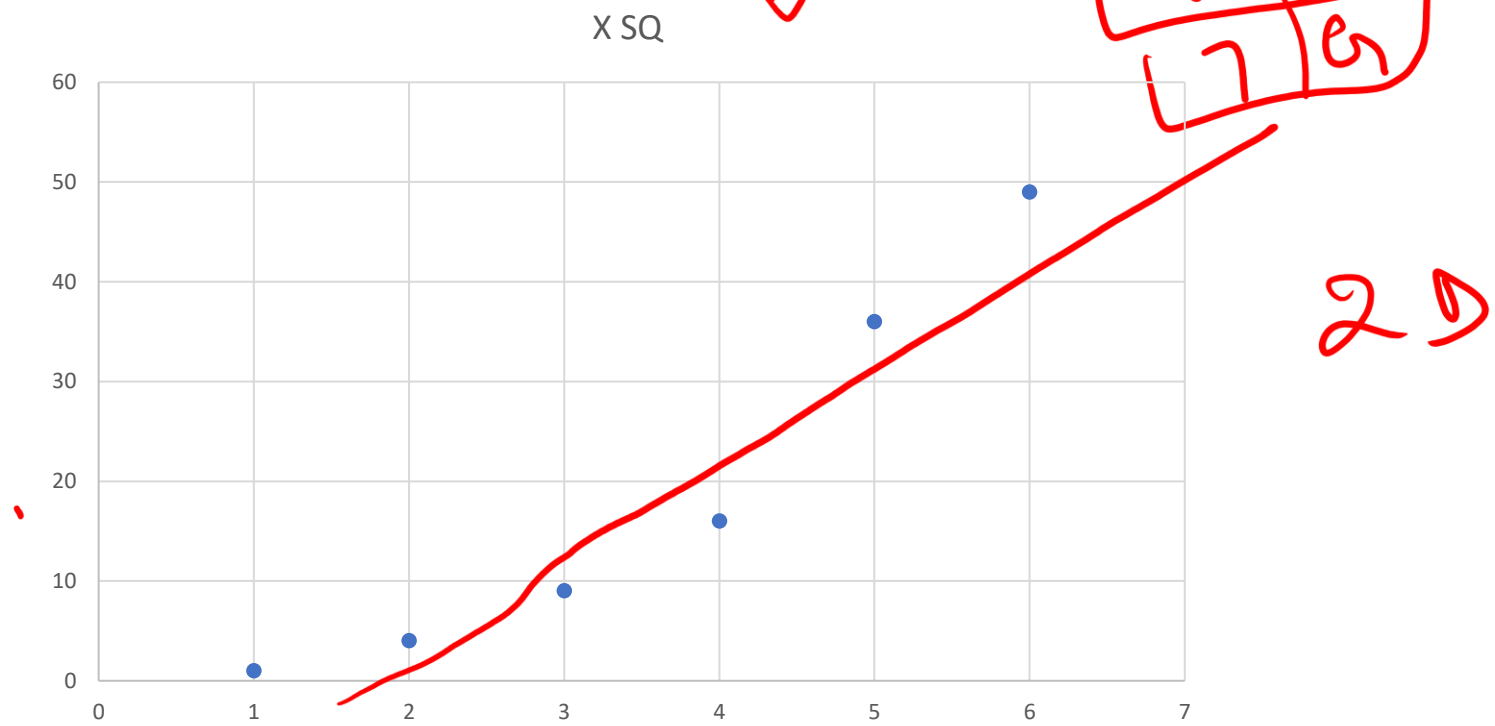
KERNEL TRICK.



NON-LINEAR CLASS


1D
0 1 2 3 4 5 6 7


X
SQ


X SQ
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7
2D