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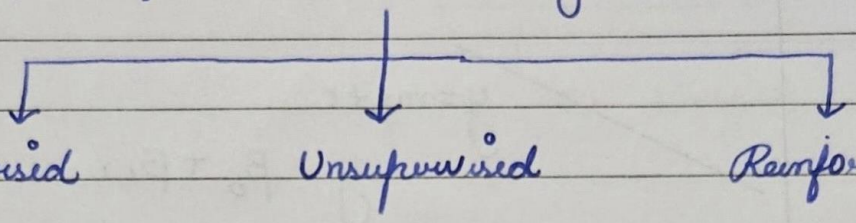
Introduction to Machine Learning

3 types of Machine Learning



Supervised → Regression
↳ Classification

Supervised ML		Unsupervised ML
1. Linear Regression		1. K-Means
2. Ridge & Lasso		2. Hierarchial Mean
3. Elastic Net		3. DB Scan Clustering
4. Logistic Regression (Classification)		
5. Decision Tree	Both Classification & Regression	
6. Random Forest		
7. Ada Boost		
8. Xg Boost		

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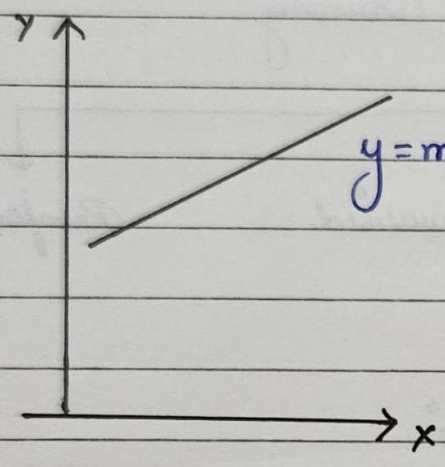
Equation of a Line, 3d plane and Hyperplane (n Dimensions)



$y = mx + c$

$y = \beta_0 + \beta_1 x$

$ax + by + c = 0$

→ $y = mx + c$ → c = intercept

→ m = slope

→ $ax + by + c = 0$

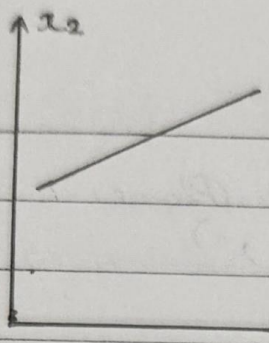
$by + c = -ax$

$by = -ax - c$

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

$\frac{-a}{b} \rightarrow m$

$\frac{c}{b} \rightarrow c$

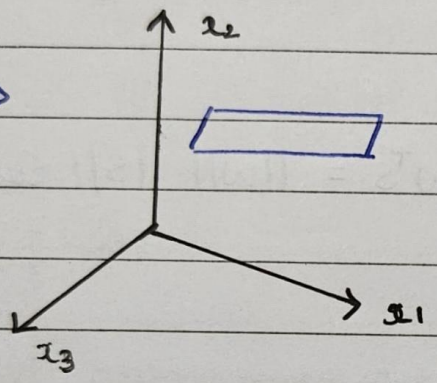


$$w_1 x_1 + w_2 x_2 + b = 0$$

$$\boxed{w^T x + b = 0}$$

↓

Eq^n of a straight line



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

$$w^T x + b = 0$$

→ n- Dimension Plane :

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

$$\boxed{w^T x + b = 0}$$

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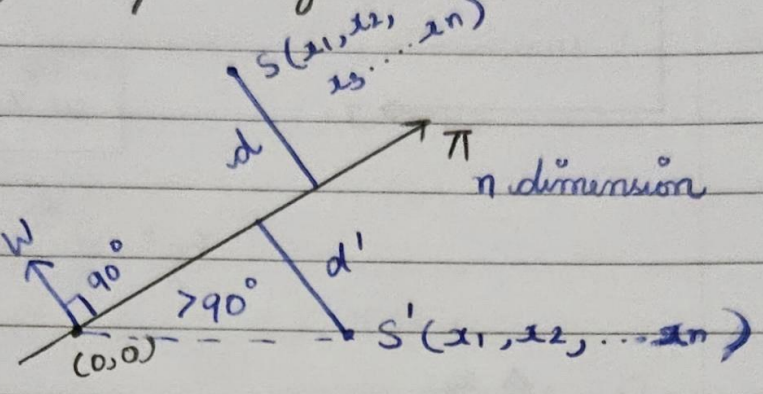
Distance of a point from Plane

$\boxed{w^T x = 0}$



$$\boxed{d = \frac{w^T S}{\|w\|}} \quad \Rightarrow w^T S = \|w\| \, \|S\| \cos\theta = +ve$$

$$d' = \frac{w^T S'}{\|w\|} \quad \Rightarrow w^T S' = \|w\| \, \|S'\| \cos\theta = -ve$$