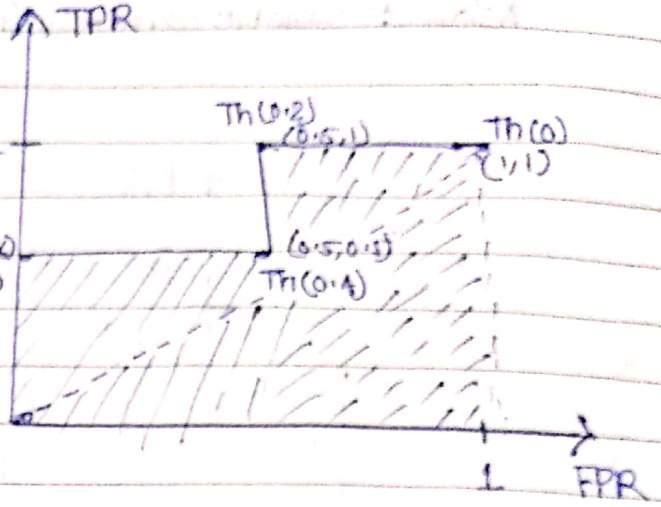
ROC/AUC

Threshold (0, 0.2, 0.4, 0.6, 0.8)

Y	$\hat{Y}$ (Pred)	$\hat{Y}$(0)	$\hat{Y}$(0.2)
1	0.7	1	1
1	0.2	1	0
0	0.9	1	1
1	0.6	1	1
0	0.4	1	1
0	0.1	1	0
1	0.5	1	1



$$TPR = \frac{TP}{P} = \frac{TP}{TP+FN} = \frac{4}{4+0}$$

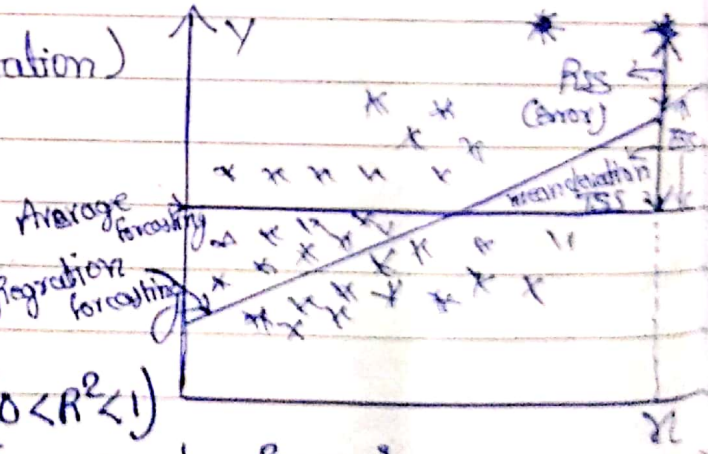
↑ TPR & TNR → should be high
↓ FPR & FNR → should be low

$$FPR = \frac{FP}{P} = \frac{FP}{FP+TN} = \frac{1}{1+1}$$

R-square & Adjusted R-Square

Forcasting (Average, Mean, Regration)

TSS - Total sum of square
ESS - Explained sum of square
RSS → Residual sum of square



$R^2 = \frac{ESS}{TSS}$ (goodness of fit) $(0 < R^2 < 1)$

(Coefficient of determination)

~ Degree of freedom

Average/sum degree of freedom = n-1

Regration degree of freedom = n-k-1 (observation, slope, intercept)

$x_1 + x_2 + x_3 = 100$ (total no variable)

degree of freedom = (n-1) = 3-1

$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$

degree of freedom = no of observation - slope - intercept

degree of freedom = n-3-1
= 6-3-1 = 2

Y	x_1	x_2	x_3
01	—	—	—
02			
03	—	—	—
04			
05	—	—	—
06	—	—	—

(no of observation)

Variable → increase ↑ → degree of freedom ↓ → Explanirty power ↓.

Relavent Variable → increase ↑ → Explaniraxty ↑
Power

$ESS + RSS = TSS$

$\frac{ESS}{TSS} + \frac{RSS}{TSS} = 1$

$\boxed{R^2 = 1 - \frac{RSS}{TSS}}$

Mean degree of freedom = $n-1$
Regration " " " = $n-k-1$

$R^2 = 1 - \frac{RSS}{TSS}$

↓ replace or adjust with degree of freedom

$$R^2_{Adjusted} = 1 - \frac{RSS/(n-k-1)}{TSS/(n-1)}$$

$$R^2_{Adjusted} = 1 - \left(\frac{n-1}{n-k-1}\right)\frac{RSS}{TSS}$$