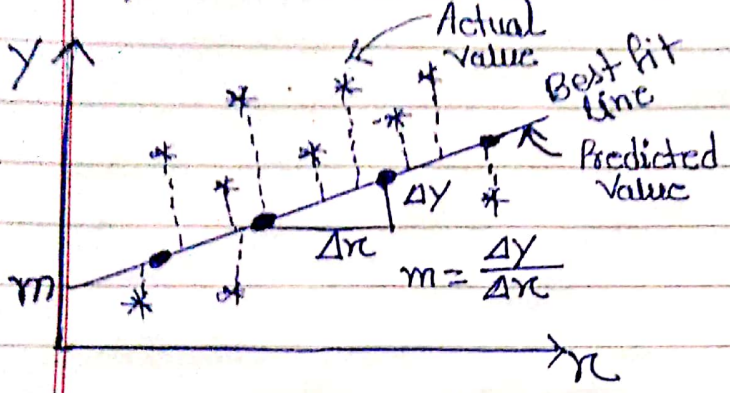
Linear Regression

~ Supervised ML Algorithm
~ predicted output is continuous and constant slope

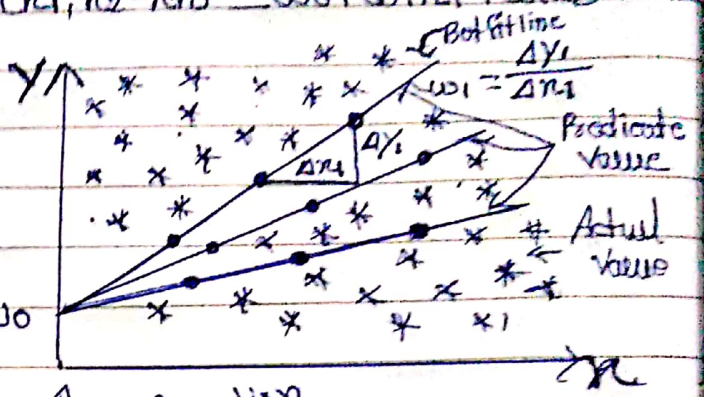
$$Y = mx + b$$



Multiple Regression

~ Bunch of different independent variables

$$f(x_1, x_2 \ldots x_n) = w_0 + w_1x_1 + w_2x_2 + \ldots$$



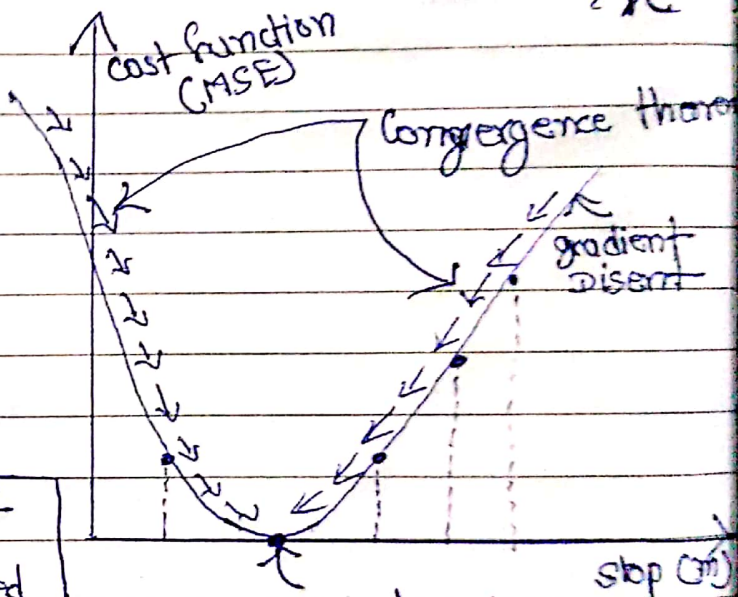
Cost function :~

~ optimizing weights
→ MSE (Mean square Error) is a Cost functions.

$$MSE = \sum_{i=1}^{n} \frac{(Actual - Predicted)^2}{N}$$

$$MSE = \frac{1}{N}\sum (y - (mx+b))^2$$

(y = actual, (mx+b) = predicated)



$$\frac{\partial f}{\partial m} = \frac{df}{dx} \times \frac{dx}{db}$$

→ from this find the Maxima/Minima

To minimize MSE we use gradient descent to calculate the gradient of our cost function

~ linearity: It can handle overfitting using dimensionlity technique and cross validation & regularization
~ It is sensitive to missing values
~ linear regresion needs the relationship b/w the independent & dependent linearly

Convergence Theorem :-

$$m = m - \frac{\partial m}{\partial m} \times \alpha$$

(α = learning rate, small value)