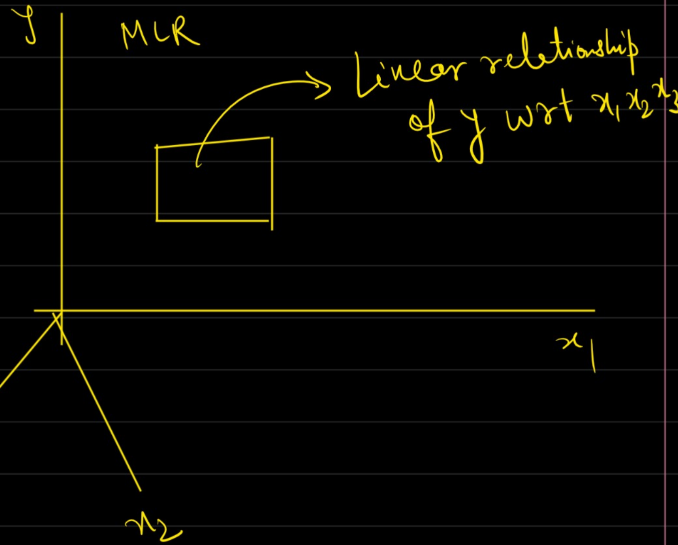
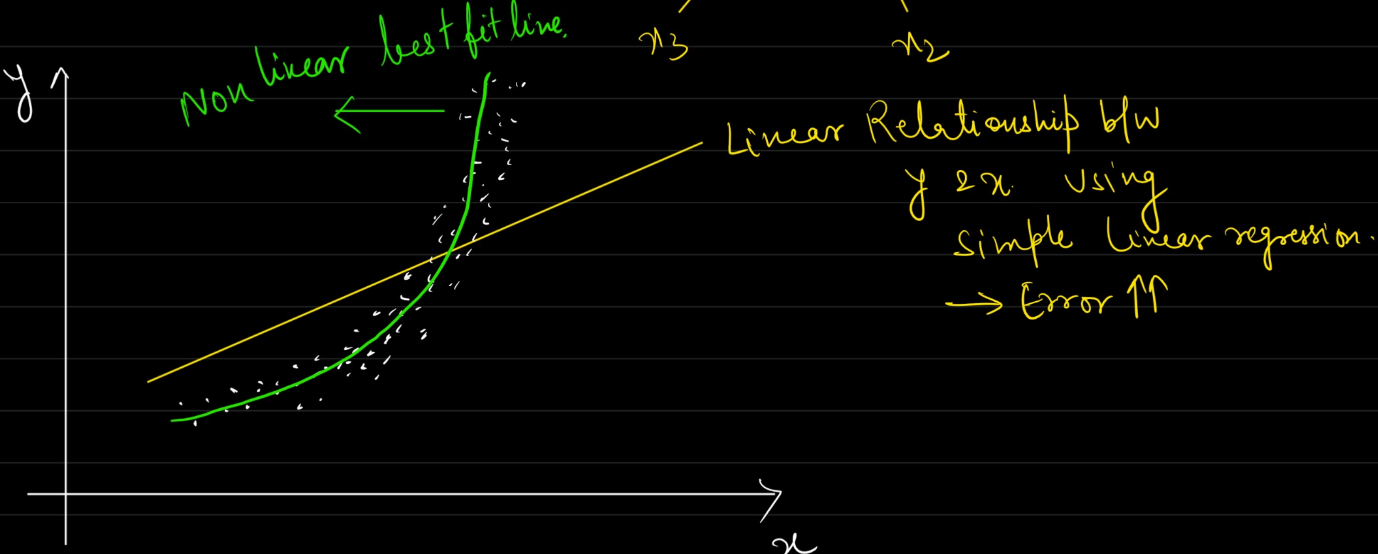
Simple Linear Reg : $h_\theta(x) = \theta_0 + \theta_1 x$.

Multiple Linear Reg : $h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \dots \theta_n x_n$



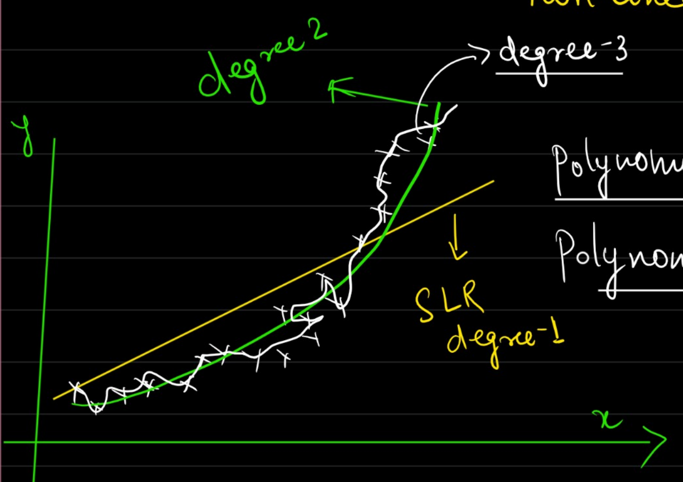


* Polynomial Regression

① Simple Polynomial Regression (1 DV and 1 IV)

↓

non linear relationship.



Polynomial degree 0 : $h_\theta(x) = \theta_0 = \theta_0 \times 1 \Rightarrow \theta_0 x_1^0$

Polynomial degree 1 : $h_\theta(x) = \theta_0 x^0 + \theta_1 x_1^{(1)}$

$= \theta_0 + \theta_1 x_1$

(Simple linear Regression)

Polynomial degree 2 : $h_\theta(x) = \theta_0 x^0 + \theta_1 x_1^1 + \theta_2 x_1^2$

Polynomial degree 3 : $h_\theta(x) = \theta_0 x^0 + \theta_1 x_1^1 + \theta_2 x_1^2 + \theta_3 x_1^3$

* As you increase the degree of polynomial you might get an overfitting model

Simple polynomial regression of degree n,

Polynomial degree (n) : $h_\theta(x) = \theta_0 x_1^1 + \theta_1 x_1^1 + \theta_2 x_1^2 + \theta_3 x_1^2 + \dots \theta_n x_1^n$

* Multiple Polynomial regression

↳ multiple independent features

x_1	x_2	x_3	y

polynomial degree 2:

$$h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_3 + \theta_4 x_1^2 + \theta_5 x_2^2 + \theta_6 x_3^2 + \theta_7 x_1 x_2 + \theta_8 x_2 x_3 + \theta_9 x_1 x_3$$

→ Original IV variable &

Power 2 (x_1^2, x_2^2, x_3^2)

&

Cross product of all features $(x_1 x_2, x_1 x_3, x_2 x_3)$