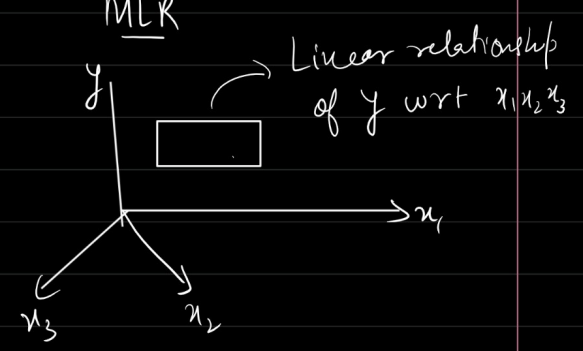
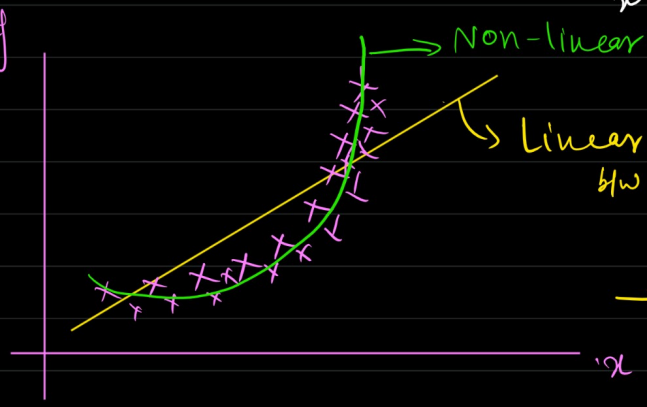
✓ Simple linear regression, $h_\theta(x) = \theta_0 + \theta_1 x$ $\quad (\theta_0 = \beta_0, c \quad \theta_1 = \beta_1, m)$

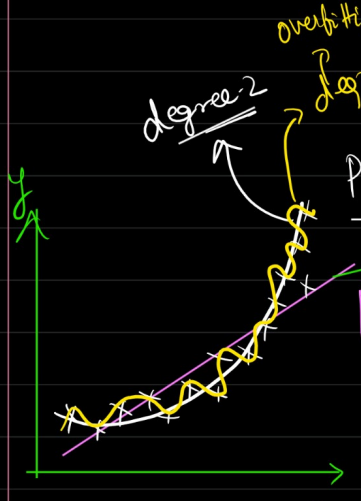
✓ Multiple linear regression, $h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \cdots \theta_n x_n$





* Polynomial regression

* Simple Polynomial regression (1 DV and 1 IV)



non linear relationship

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

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

* As you increase the degree you might get an overfitting model.

Simple Polynomial regression of degree n

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

* Multiple Polynomial regression

↳ multiple independent features

x_1	x_2	x_3	y

Polynomial degree : 2 :

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

Origin IV raised to power 2 (x_1^2, x_2^2, x_3^2)

as well cross product $(x_1 x_2, x_1 x_3, x_2 x_3)$