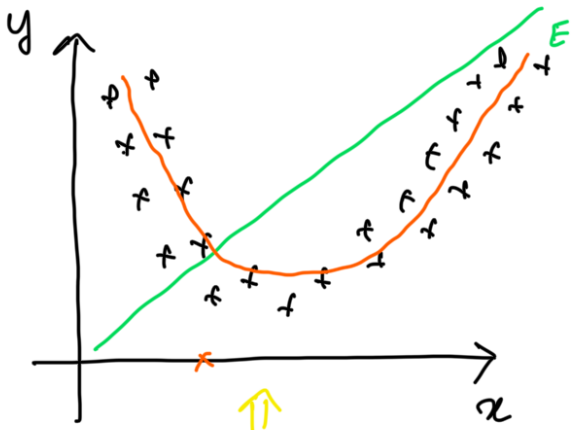
# Polynomial Regression

hence we cannot use simple / multiple linear regression



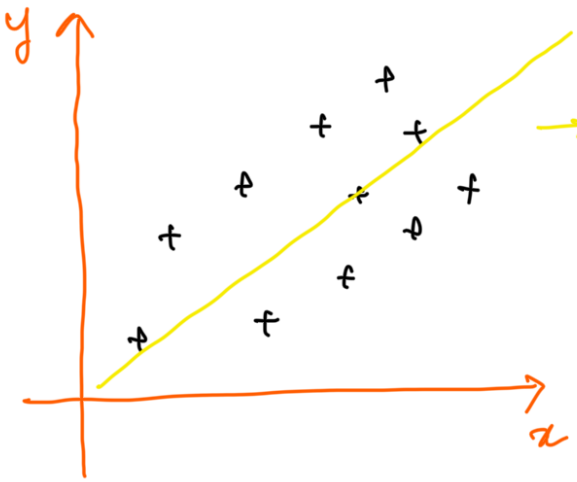

Error ↑↑ (high error)

Error ↓↓ → polynomial regression

there is no linear relationship, hence this is NON linear relationship

$h_\theta(x) = \beta_0 + \beta_1 x$ → simple linear regression

$h_\theta(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$ → Multiple linear regression




→ hyper plane

## Polynomial Degrees

### simple polynomial regression

degree = 0

$h_\theta(x) = \beta_0 \times x^0 \Rightarrow$ constant value

degree = 1

$h_\theta(x) = \beta_0 \times x^0 + \beta_1 \times x^1 \Rightarrow$ simple linear regression

degree = 2

$$h_\theta(x) = \beta_0 \times x^0 + \beta_1 x^1 + \beta_2 x^2$$

degree = n

$$h_\theta(x) = \beta_0 \times x^0 + \beta_1 x^1 + \beta_2 x^2 + \cdots + \beta_n x^n$$

We will have to select the degree to form a best fit line

→ We should not overfit the model
→ We should not underfit the model.

Basically, we use the polynomial degrees to generalize the model.

We will mainly use the polynomial regression to solve the non linear relation