

# Bias/Variance

$\hat{f}$

MSE:

$$E_{(x,y)_{test}} |\hat{f}(x) - y|^2$$

MSE > 1 to:

- Overfitting

modelo demasiado relacionado con conjunto de entrenamiento

- Underfitting

no reúne la suficiente información del conjunto de entrenamiento

noise

- Ruido en datos

$x \rightarrow y$

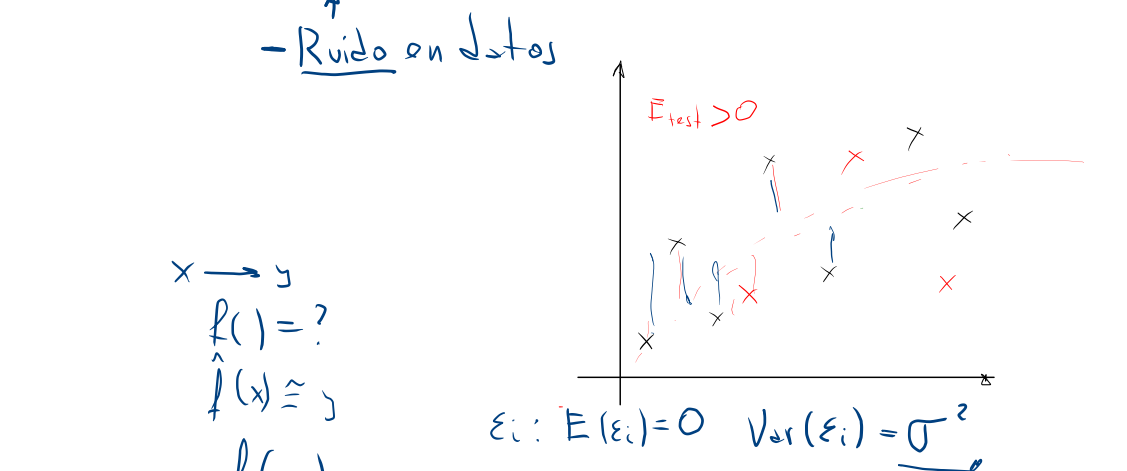
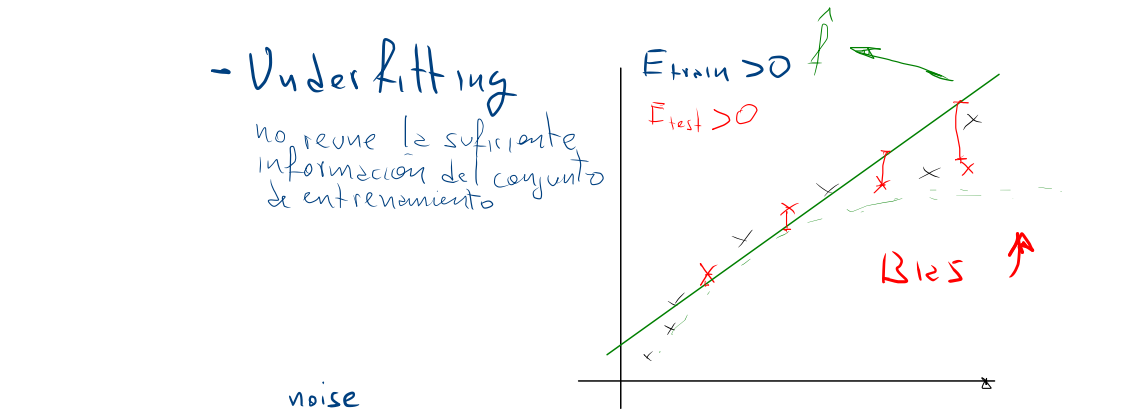
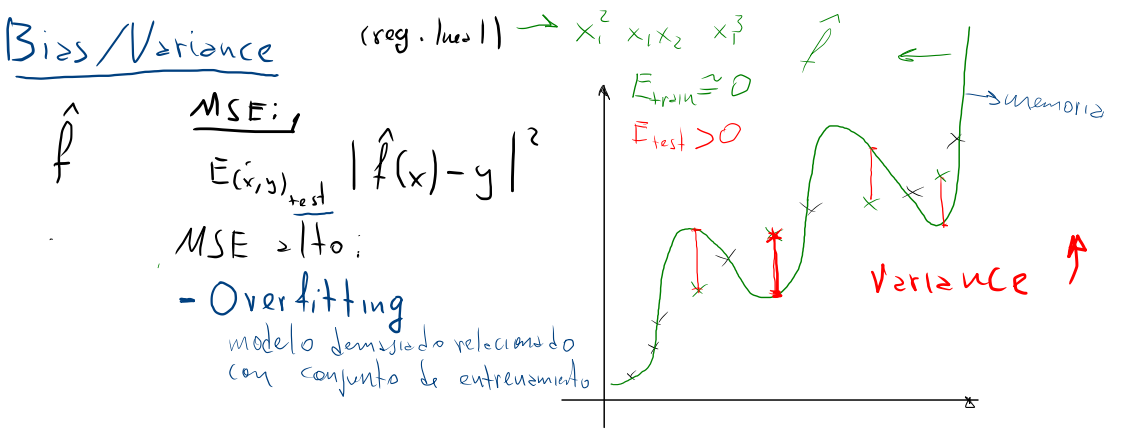
$f() = ?$

$\hat{f}(x) \approx y$

$y_i = f(x_i) + \epsilon_i$

$y_i = \hat{f}(x_i)$

modelo de pred.



MSE:

$$MSE_{test} = E((y - \hat{f}(x))^2)$$

$$= \sigma^2 + \underbrace{(E(f(x) - \hat{f}(x)))^2}_{\text{underfitting}} + \underbrace{Var(f(x) - \hat{f}(x))}_{\text{overfitting}}$$

$MSE_{test} = \sigma^2 + (Bias \hat{f}(x))^2 + Var \hat{f}(x)$

test set      underfitting      overfitting

