

$$E[(y_0 - \hat{f}(x_0))^2] = E[((y_0 - y) - (\hat{f}(x_0) - y))^2]$$

$$= E[(y_0 - y)^2 - 2(y_0 - y)(\hat{f}(x_0) - y) + (\hat{f}(x_0) - y)^2]$$

$$= E[(y_0 - y)^2] - E[2(y_0 - y)(\hat{f}(x_0) - y)] + E[(\hat{f}(x_0) - y)^2]$$

$$= \text{Var}(y_0) + \text{Var}(\hat{f}(x_0)) - 2E[(y_0 - y)(\hat{f}(x_0) - y)]$$

Irreducible
Sampling
error

Variance
Term

Bias???