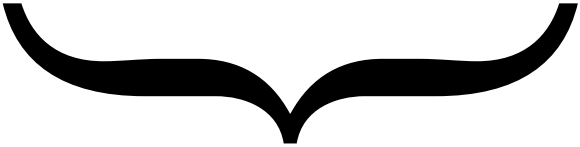


[tryitout:https://flosswald.shinyapps.io/bias_variance/]

Expected **test MSE**

$$E \left(y_0 - \hat{f}(x_0) \right)^2 = \text{Var}(\hat{f}(x_0)) + \left[\text{bias}(\hat{f}(x_0)) \right]^2 + \text{Var}(\epsilon)$$

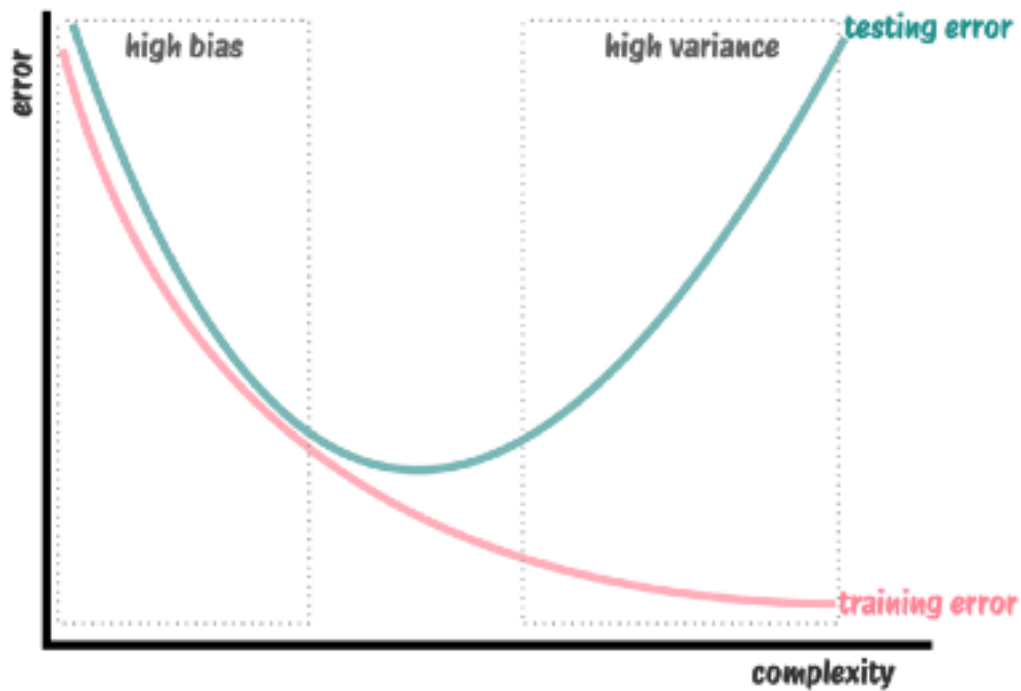


variance increases
with complexity

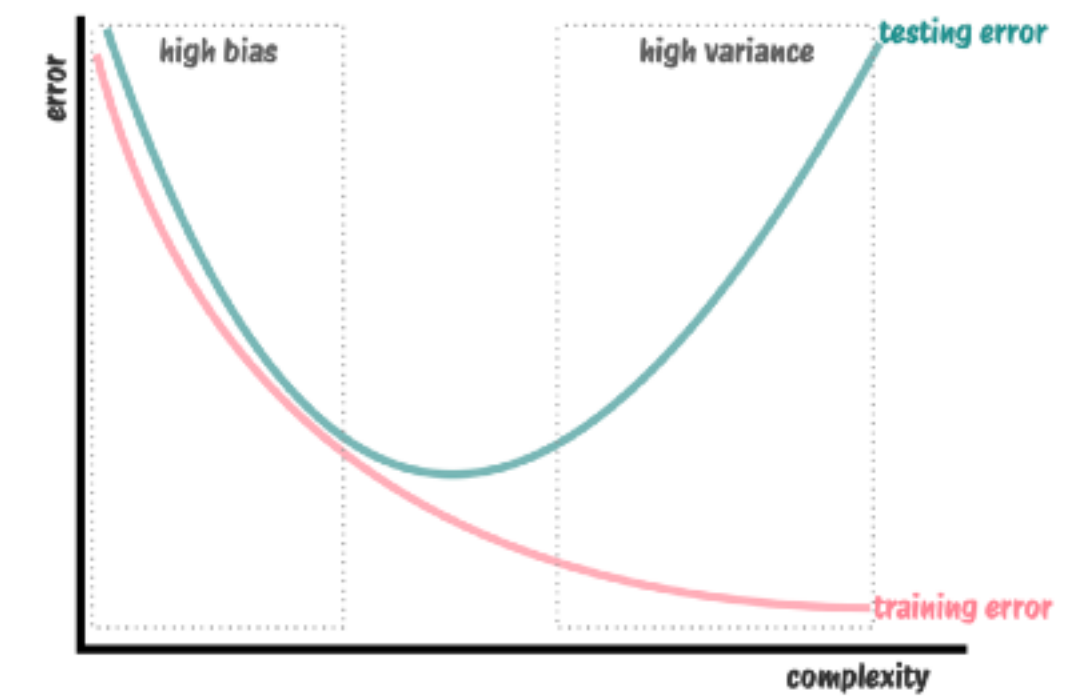


bias decreases
with complexity

Formalizing Bias-Variance Trade-Off



Formalizing Bias Variance Trade-Off



Expected **test MSE**

$$E \left(y_0 - \hat{f}(x_0) \right)^2 = \underbrace{\text{Var}(\hat{f}(x_0))}_{\text{variance increases with complexity}} + \underbrace{\left[\text{bias}(\hat{f}(x_0)) \right]^2}_{\text{bias decreases with complexity}} + \text{Var}(\epsilon)$$

variance increases
with complexity

bias decreases
with complexity

Bias Variance Trade-Off

