

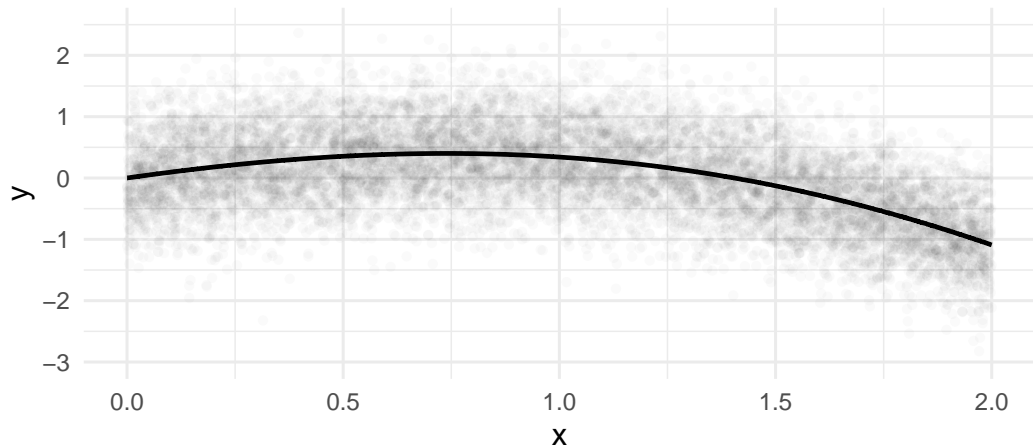
Bias-Variance Tradeoff

Ari Anisfeld

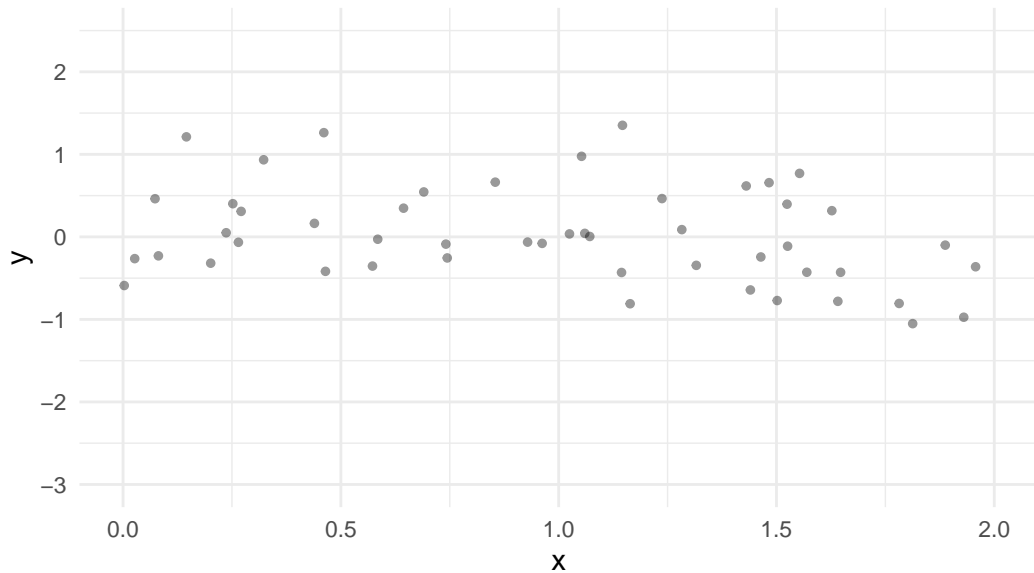
2025-01-17

Consider a data generating process (\mathcal{P})

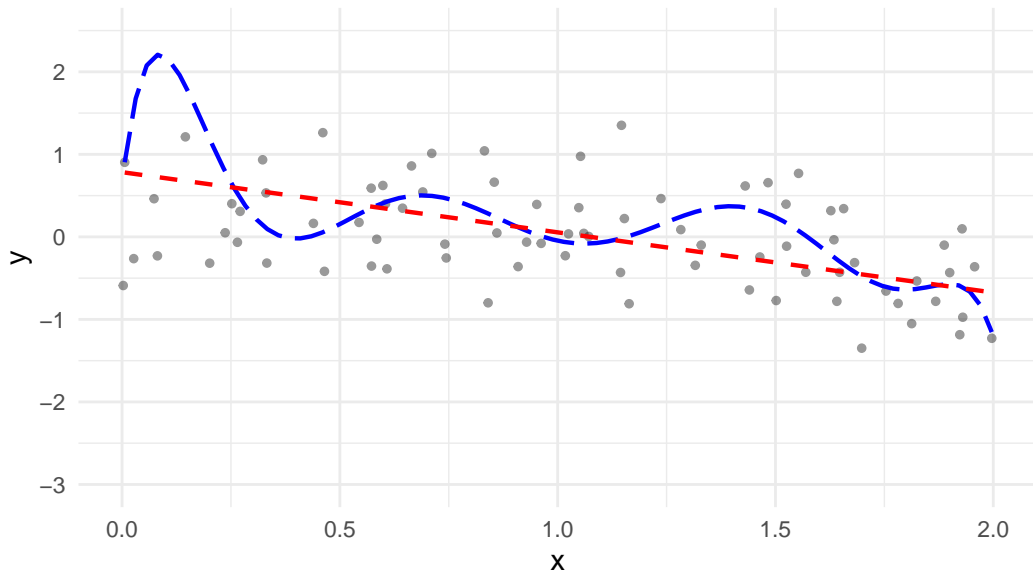
$$y_i = \sin(x_i) - .5 \times x_i^2 + \epsilon_i, \quad \epsilon_i \sim \mathcal{N}(0, \sigma_\epsilon)$$



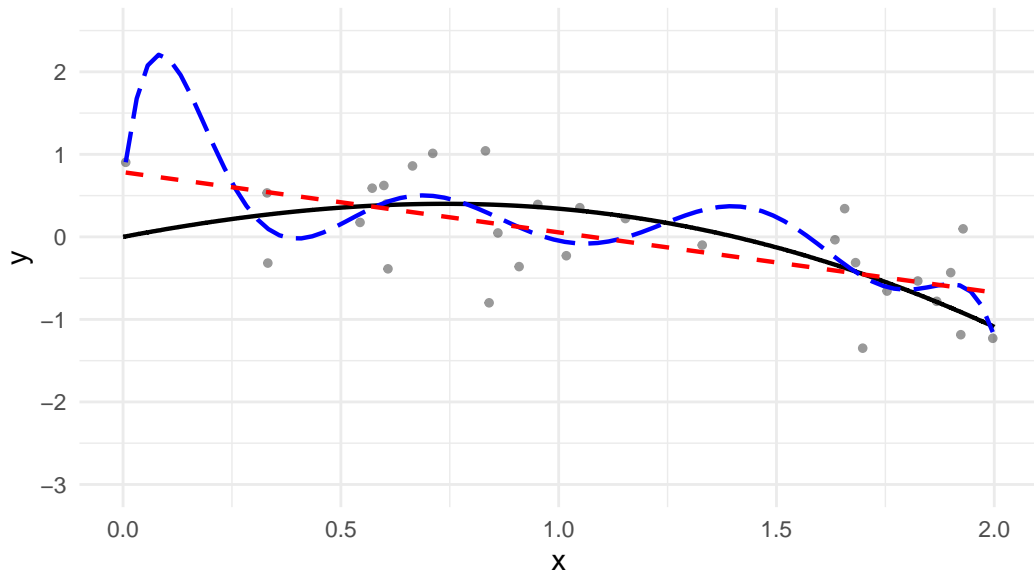
We take a random sample from \mathcal{P}



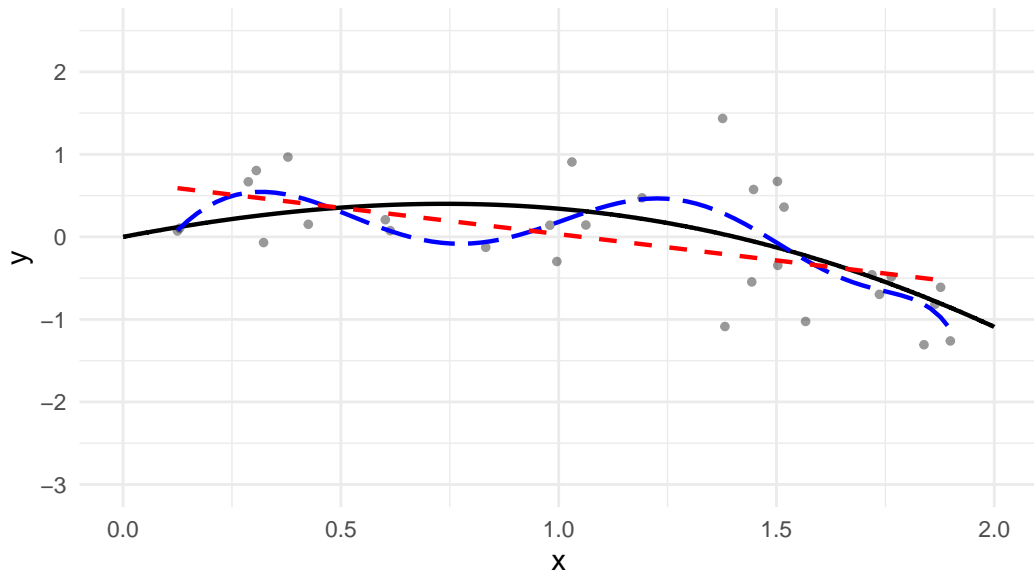
Fit two models: linear and an 8th degree polynomial



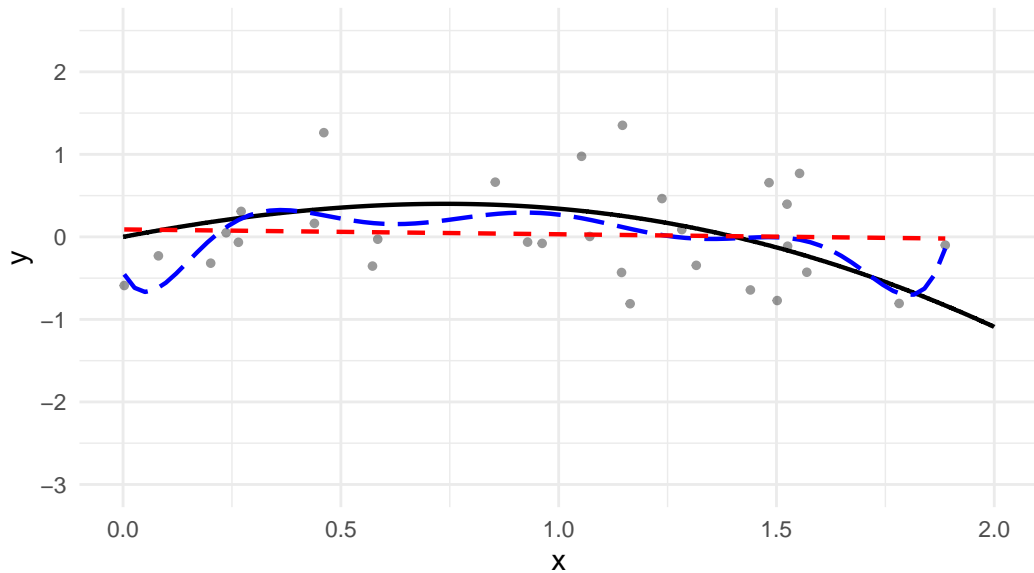
Fit two models: linear and an 8th degree polynomial



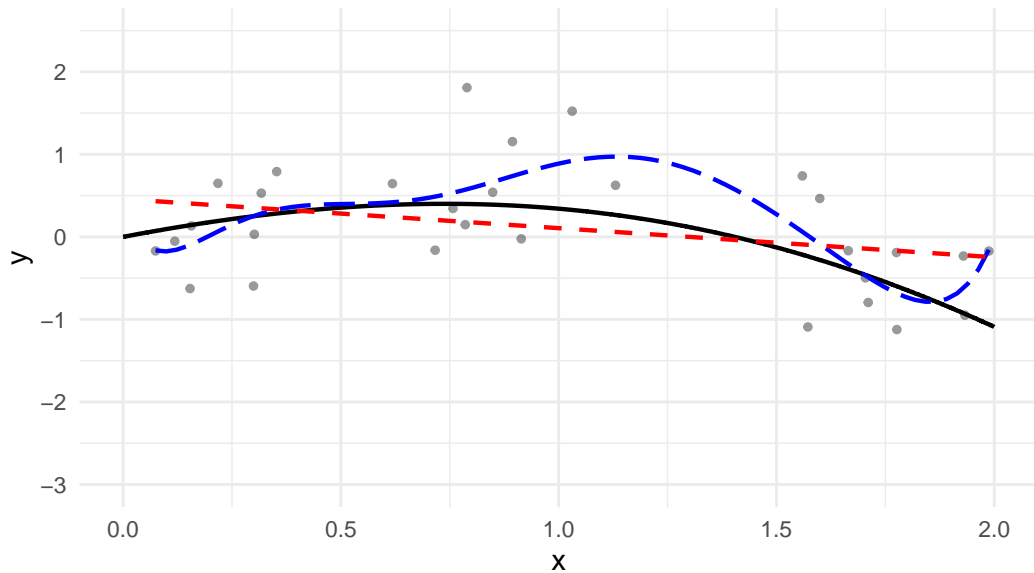
... and sample from \mathcal{P} again



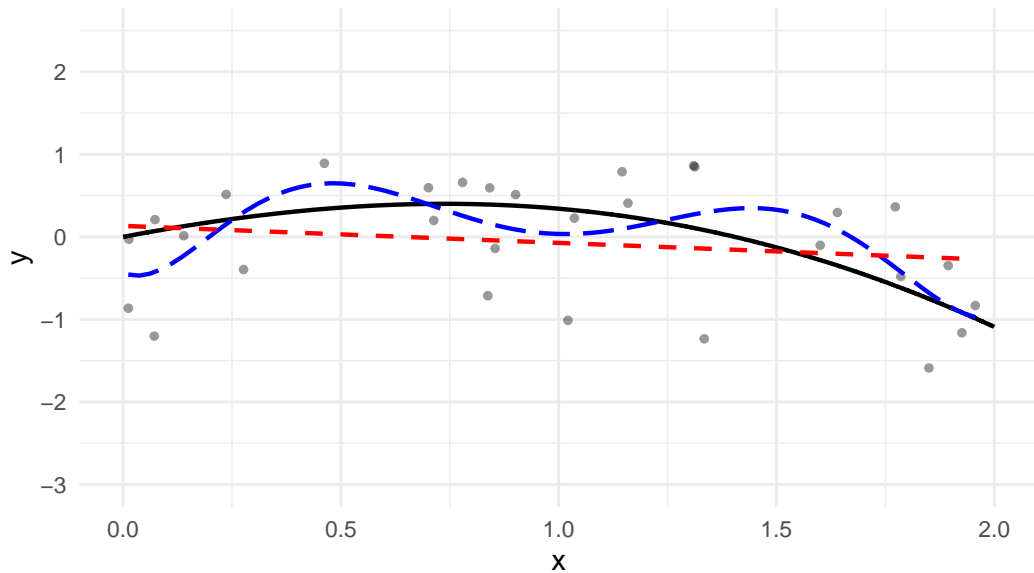
... and sample from \mathcal{P} again



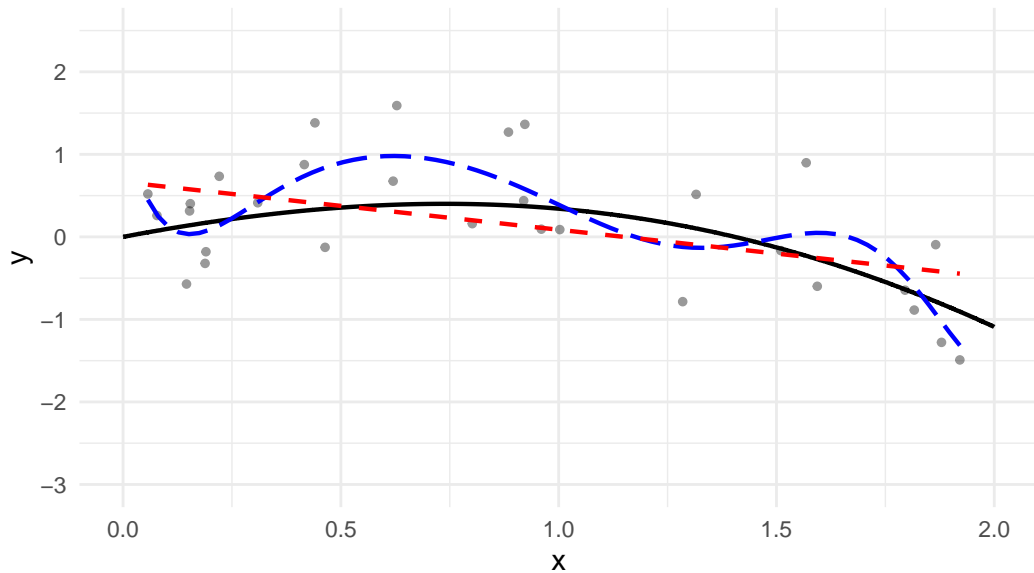
... and sample from \mathcal{P} again



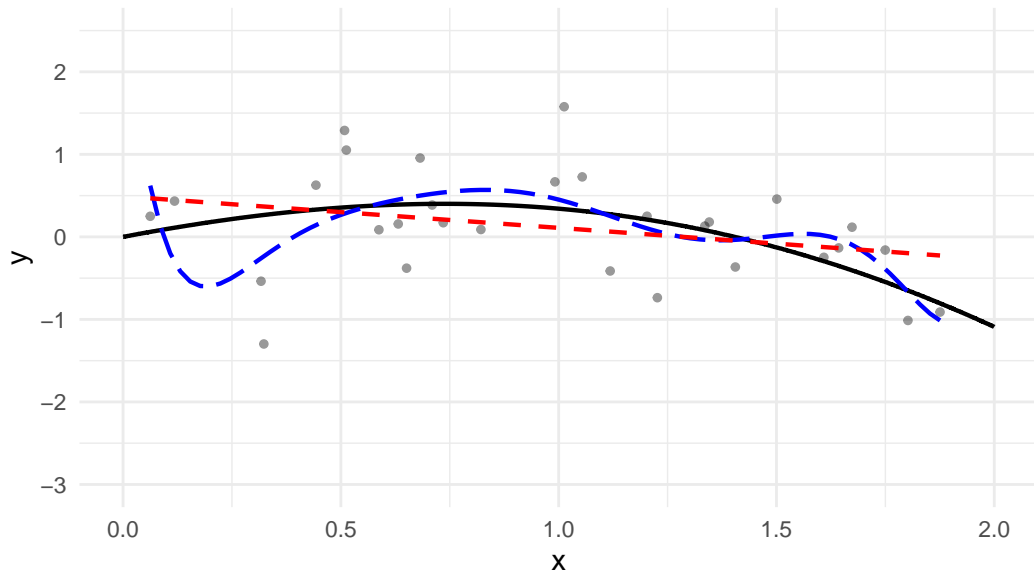
... and sample from \mathcal{P} again



... and sample from \mathcal{P} again



... and sample from \mathcal{P} again



If we did this many times and averaged the functions

