Effective Programming Practices for Economists
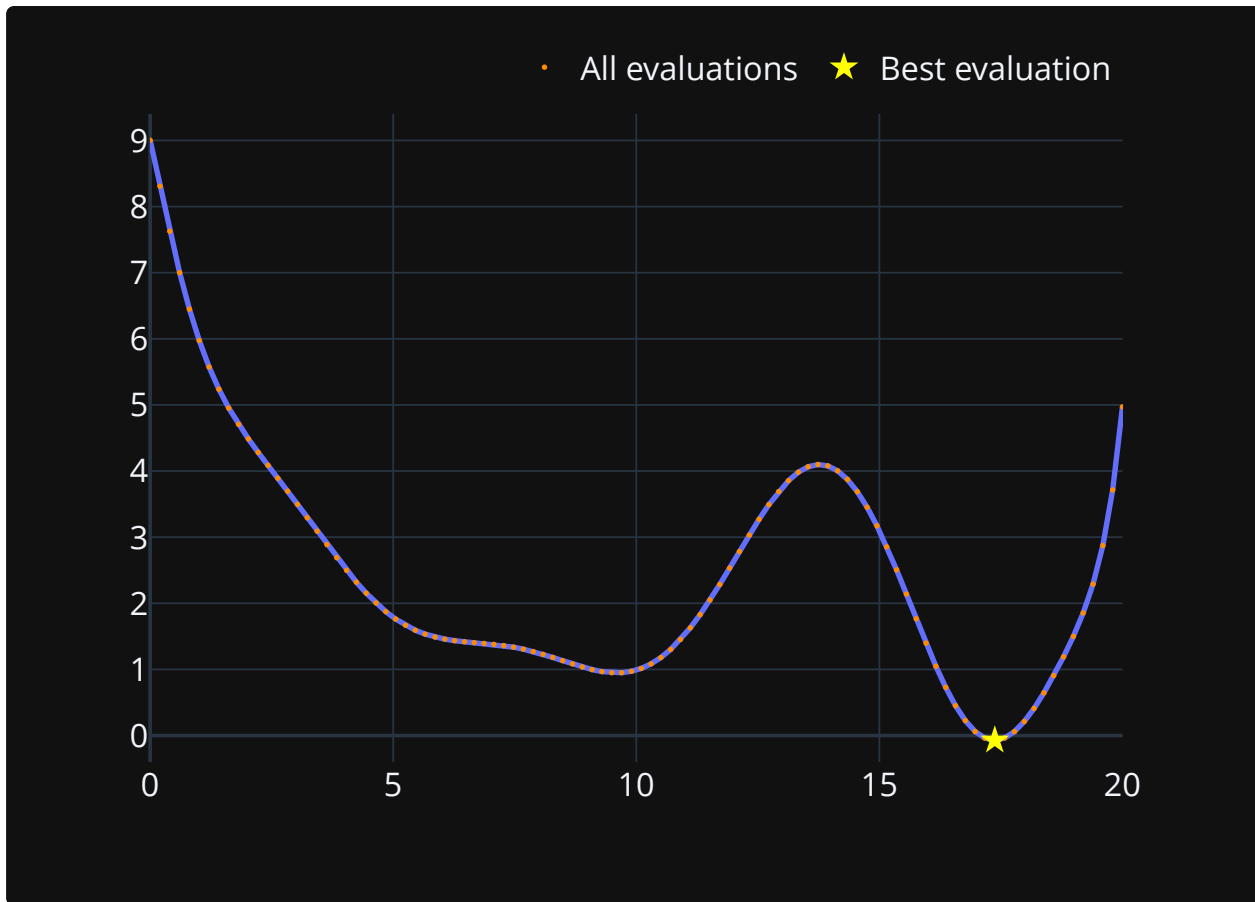
Numerical Optimization

Grid Search

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Grid Search

- Very simple!

- Fix a grid of parameter values.

- Evaluate the function at each grid point.

- Pick the best.

Grid Search: Properties

- Needs bounds on the parameter (0 to 20 in our case).

- Desired precision determines number of grid points.

- Very feasible in one dimension.

- Else: Curse of dimensionality.

Curse of Dimensionality

- Suppose we have $p > 1$ parameters.

- If we use n grid points in each dimension, we require n^p function evaluations.

- This grows exponentially with p, making grid search infeasible in higher dimensions.

- Example:

  - 5 parameters and 100 grid points per parameter
  - $100^5 = 10^{10}$ required function evaluations
  - Assume one function evaluation takes 1 millisecond
  - 10^{10} milliseconds $\approx$ 115 days