

Parts b and c

Monday, June 3, 2019 7:00 PM

Part b

See code

N = 10 : Least squares estimate of (a,b) is mean (0.92, -0.14) with std dev (0.34, 0.40)

N = 100 : Least squares estimate of (a,b) is mean (1.01, -0.13) with std dev (0.11, 0.11)

N = 1000 : Least squares estimate of (a,b) is mean (1.00, -0.10) with std dev (0.03, 0.03)

We can see that as the amount of data used increases (i.e. N increases),
our estimates for a and b get better.

The mean gets closer to the true value and the standard deviation decreases.

This is in accordance with what we expect which is that more data will
result in a better estimate.

True values of a and b are (1.00, -0.10)

Part c

See code

N = 10 : Least squares estimate of (a,b) is mean (0.98, -0.20) with std dev (0.85, 1.08)

N = 100 : Least squares estimate of (a,b) is mean (0.83, -0.01) with std dev (0.65, 0.87)

N = 1000 : Least squares estimate of (a,b) is mean (0.99, -0.22) with std dev (0.47, 0.36)

These estimates are worse than the estimates from part b.

The mean is further from the true values and the standard deviation is higher.

This makes sense because the noise is no longer independent between each sample,
which adversely affects the quality of our estimate.

True values of a and b are (1.00, -0.10)