PH21 Assignment 5

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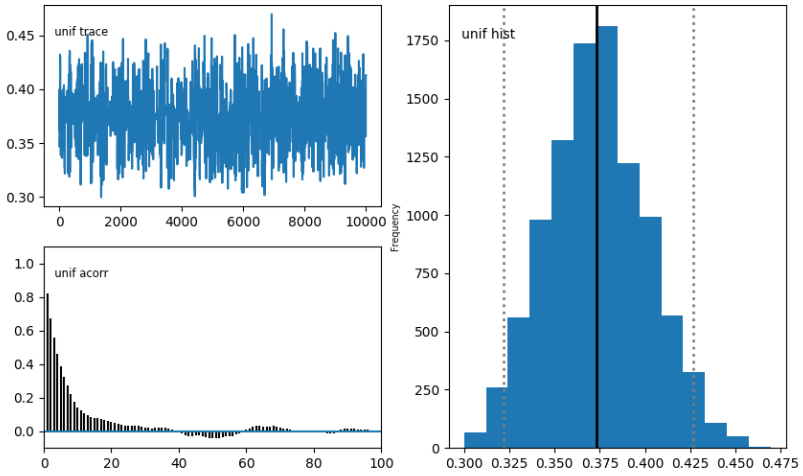
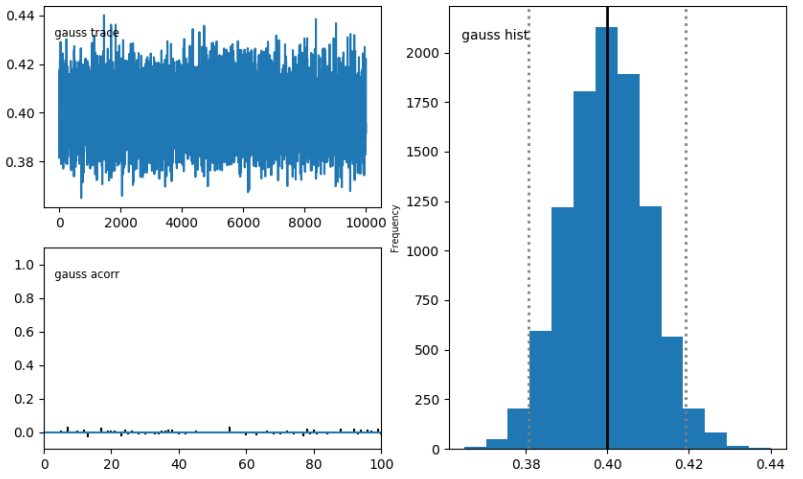
1 Coin

I used pymc to generate the following plots/distributions, with a chain length of 10k:

True probability = 0.4:



uniform prior coin toss ; 95% confidence interval: [0.322 0.427]



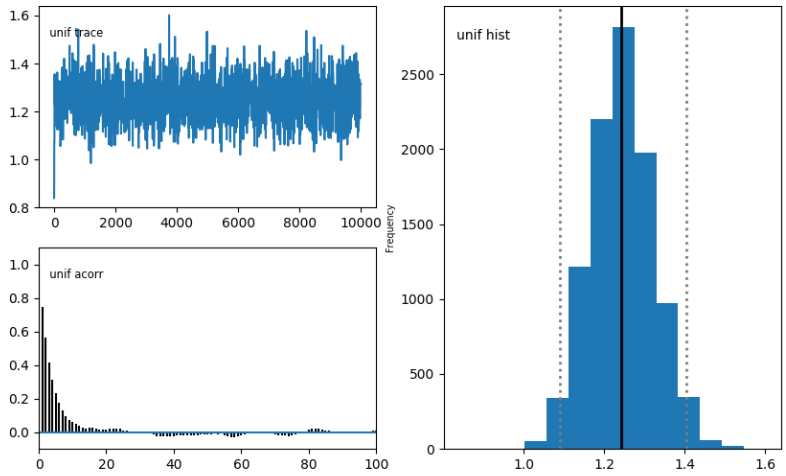
gaussian prior coin toss ; 95% confidence interval: [0.395 0.503]

The uniform prior consistently did not converge on the right interval as quickly, even when I increased the chain length to 3000; this is because the uniform prior has more variation. The trace amplitude is larger, and the peak is less crisp.

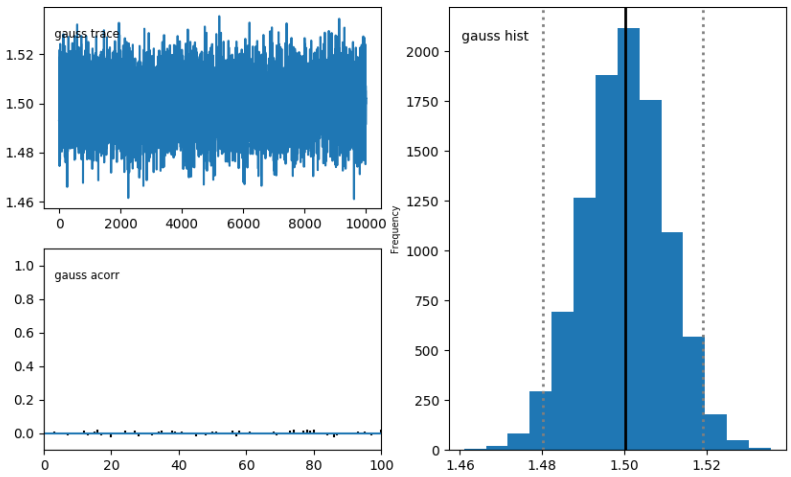
Varying the bias value for the gaussian prior threw off the results, depending on how much variation we allowed.

2 Lighthouse

True b = 1.5:

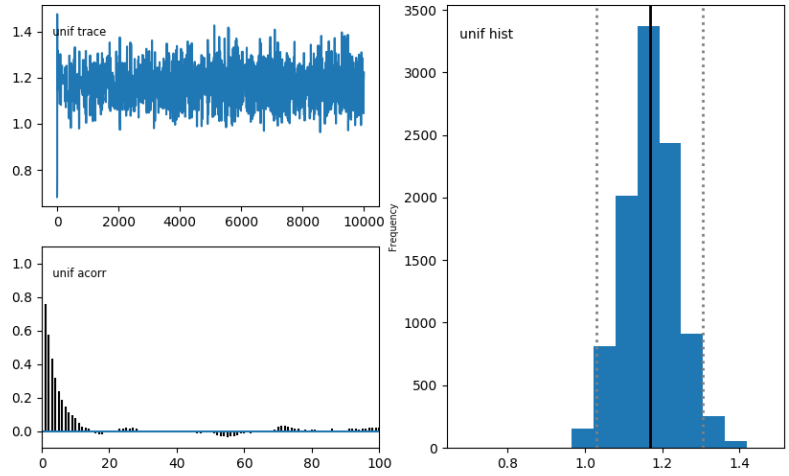


uniform prior coin toss ; 95% confidence interval: [1.186 1.484]

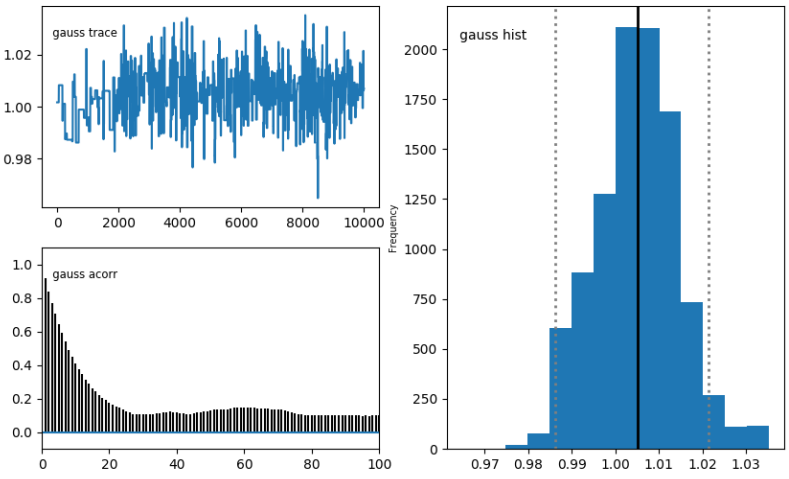


gaussian prior coin toss ; 95% confidence interval: [1.476 1.513]

True a = 1.0:



uniform prior coin toss ; 95% confidence interval: [1.134 1.437]



gaussian prior coin toss ; 95% confidence interval: [0.986 1.021]

Similar to before, the uniform prior was consistently less accurate because of its greater variation; here it converged quickly to a wrong mean.

The gaussian prior is consistently more accurate.