

Statistics 3858b Assignment 5

Handout April 4, 2018 ; Due date: April 11, 2018

These questions are Bayes estimation problems. For the exam purpose you will mostly use conjugate priors as you not have computing access during exams.

Notice The final exam is on April 16, 7 - 10 PM, SSC (Social Science Centre) room 2036.

1. 8.10.4 (e)
2. 8.10.7 (d)
3. Use the coin tipping data. Find the Bayes estimator of p the probability of Head, using a Beta(3, 1) prior. Plot the prior and posterior. Find the Bayes estimator of p , and give the 90% Bayes confidence interval (also called the credibility interval).

Repeat but use a Beta(1, 1) prior.

Now use a prior

$$f_P(p) = c \sin(\pi p) I(0 \leq p \leq 1)$$

where c is the constant to make this a pdf. Notice this function is a pdf, since $\sin(\pi p) \geq 0$ for all $p \in [0, 1]$. Find c and plot f_P . Calculate the Bayes estimate of p (do not calculate the Bayes confidence interval). For this you will need to do something similar to the numerical example from class since this is not a conjugate prior. Plot the posterior and compare it with the posterior obtained from the prior Beta(3, 1). You can graph them on one plot and comment on this to make this comparison.