Assignment 4

Hamid Khajehei

**Task A:**

1. recreation of Figure 6.4

For this task, I used slicesampling (matlab function) for posterior.

C:\Users\hamkha\OneDrive - ltu.se\Course\Bayesian Analysis\Assignment 4\My code_Task A\Results.tif

1. for this part I have used matlab stan.

**a)** Given the following measurements: y = [1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1 ,1 ,1]

i. What is the expected probability of getting a head? Give a 95% credible interval of this probability.

I used HDI, the low and high limits of HDI is shown in the figure [0.54, 0.93].

C:\Users\hamkha\OneDrive - ltu.se\Course\Bayesian Analysis\Assignment 4\My code_part 2\untitled2.tif

ii. What is the probability that ?

I used the below code:

SampleSize= length(theta1);

p= sum((theta1>=0.5)); % number of times that theta has been greater than 0.5

PP= p/SampleSize; % probability of theta>0.5

The results show that the probability that theta>0.5 is 0.9818

**b)** Given an additional set of measurements y2 = [1, 0, 0, 0, 0, 0, 0, 1, 1, 0];

are and measurements from the same coin? You may answer this in different ways:

Answer this by calculating the probability that given the measurements y1 andy2.

I computed the probability of both and and compare the results.

The probability of was 0.9818 and the was 0.1124.

It means that the first set of measurements are sampled from a fair coin while the second set of measurements have been sampled from an unfair coin. Hence, we may conclude that the measurements were not from the same coin.

C:\Users\hamkha\OneDrive - ltu.se\Course\Bayesian Analysis\Assignment 4\My code_part 2\AdditionalMeaurements.tif