Lesson 11

测验, 5 个问题

5/5 分 (100%)

✔ 恭喜！您通过了！

下一项

✔ 1 / 1 分

1。

Suppose we flip a coin five times to estimate θ, the probability of obtaining heads. We use a Bernoulli likelihood for the data and a non-informative (and improper) Beta(0,0) prior for θ. We observe the following sequence: (H, H, H, T, H).

Because we observed at least one H and at least one T, the posterior is proper. What is the posterior distribution for θ?

- Beta(1.5, 4.5)
- Beta(1,4)
- ◉ Beta(4,1)

正确

We observed four "successes" and one "failure," and these counts are the parameters of the posterior beta distribution.

- Beta(2,5)
- Beta(5,2)
- Beta(4.5, 1.5)

✔ 1 / 1 分

5/5 分 (100%)

2。
Continuing the previous question, what is the posterior mean for θ ? Round your answer to one decimal place.

0.8

正确回答
This is the same as the MLE, $\bar{y}$.

1 / 1 分

3。
Consider again the thermometer calibration problem from Lesson 10.

Assume a normal likelihood with unknown mean θ and known variance $\sigma^2 = 0.25$. Now use the non-informative (and improper) flat prior for θ across all real numbers. This is equivalent to a conjugate normal prior with variance equal to ∞ .

- You collect the following $n = 5$ measurements: (94.6, 95.4, 96.2, 94.9, 95.9). What is the posterior distribution for θ ?

- $\mathrm{N}(96.0, 0.25^2)$
- $\mathrm{N}(95.4, 0.05)$

正确
This is $\mathrm{N}(\bar{y}, \frac{\sigma^2}{n})$.

- $\mathrm{N}(95.4, 0.25)$
- $\mathrm{N}(96.0, 0.05^2)$

1 / 1 分

4。

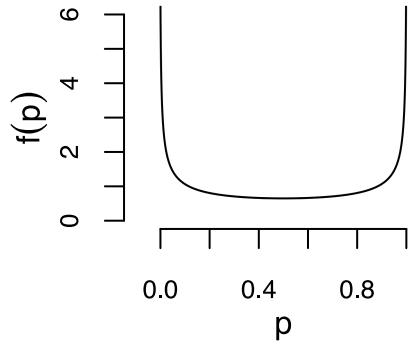
Lesson 11

测验, 5 个问题

Which of the following graphs shows the Jeffreys prior for a Bernoulli/binomial success probability p ?

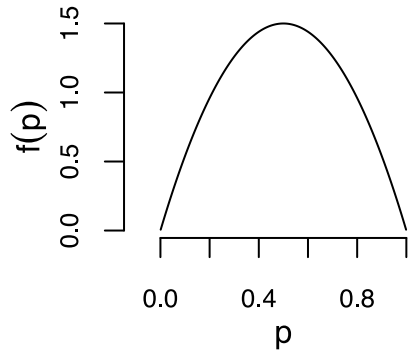
5/5 分 (100%)

Hint: The Jeffreys prior in this case is Beta(1/2, 1/2).



正确

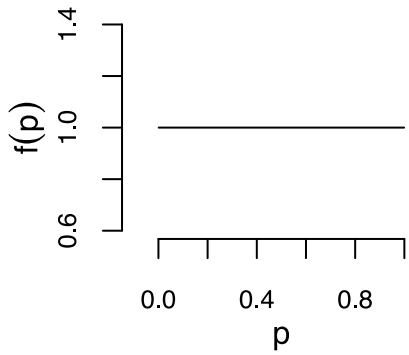
Beta distributions with parameters between 0 and 1 have a distinct "U" shape.

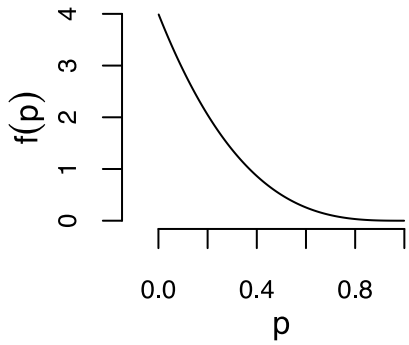


Lesson 11

测验, 5 个问题

5/5 分 (100%)





1 / 1 分

5。

Scientist A studies the probability of a certain outcome of an experiment and calls it θ . To be non-informative, he assumes a Uniform(0,1) prior for θ .

Scientist B studies the same outcome of the same experiment using the same data, but wishes to model the odds $\phi = \frac{\theta}{1-\theta}$. Scientiest B places a uniform distribution on ϕ . If she reports her inferences in terms of the probability θ , will they be equivalent to the inferences made by Scientist A?

- Yes, they both used uniform priors.
- Yes, they used the Jeffreys prior.

5/5 分 (100%)

- No, they are using different parameterizations.
- No, they did not use the Jeffreys prior.

正确

The uniform prior on θ implies the following prior PDF for ϕ : $f(\phi) = \frac{1}{(1+\phi)^2} I_{\{\phi \geq 0\}}$, which clearly is not the uniform prior used by Scientist B.

They would obtain equivalent inferences if they both use the Jeffreys prior.