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Lesson 4

LATEST SUBMISSION GRADE
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1. **For Questions 1-3, consider the following scenario:**

   1 / 1 point

   In the example from Lesson 4.1 of flipping a coin 100 times, suppose instead that you observe 47 heads and 53 tails.

   - Report the value of $\hat{p}$, the MLE (Maximum Likelihood Estimate) of the probability of obtaining heads.

   0.47

   Correct
   This is simply 47/100, the number of successes divided by the number of trials.

2. Coin flip:

   1 / 1 point

   Using the central limit theorem as an approximation, and following the example of Lesson 4.1, construct a 95% confidence interval for p, the probability of obtaining heads.

   - Report the lower end of this interval and round your answer to two decimal places.

   0.37

   Correct
   We have $\hat{p} - 1.96\sqrt{\hat{p}(1-\hat{p})/n} = .47 - 1.96\sqrt{(.47)(.53)/100} = .372$, which is the lower end of a 95% confidence interval for p.

3. Coin flip:

   1 / 1 point

   - Report the upper end of this interval and round your answer to two decimal places.

   0.57

   Correct
   We have $\hat{p} + 1.96\sqrt{\hat{p}(1-\hat{p})/n} = .47 + 1.96\sqrt{(.47)(.53)/100} = .568$, which is the upper end of a 95% confidence interval for p.

4. The likelihood function for parameter θ with data $\mathbf{y}$ is based on which of the following?

   0 / 1 point

   - (selected) $P(\theta \mid \mathbf{y})$
   - $P(\mathbf{y} \mid \theta)$
   - $P(\theta)$
   - $P(\mathbf{y})$
   - None of the above.

   Incorrect
   This is the posterior distribution of θ given data. We will learn how to compute this later.

   Coursera suggests this material BETA   Was this material helpful? Yes No

Lesson 4.2 Likelihood function and maximum likelihood

Video • 7 min

5. Recall from Lesson 4.4 that if $X_1, \ldots, X_n \overset{\text{iid}}{\sim} \text{Exponential}(\lambda)$ (iid means independent and identically distributed), then the MLE for λ is $1/\bar{x}$ where $\bar{x}$ is the sample mean. Suppose we observe the following data: $X_1 = 2.0,\ X_2 = 2.5,\ X_3 = 4.1,\ X_4 = 1.8,\ X_5 = 4.0.$

1 / 1 point

Calculate the MLE for λ. Round your answer to two decimal places.

0.35

Correct

The sample mean is $\bar{x} = 2.88$.

6. It turns out that the sample mean $\bar{x}$ is involved in the MLE calculation for several models. In fact, if the data are independent and identically distributed from a Bernoulli(p), Poisson(λ), or Normal(μ, σ^2), then $\bar{x}$ is the MLE for p, λ, and μ respectively.

1 / 1 point

Suppose we observe $n = 4$ data points from a normal distribution with unknown mean μ. The data are $\mathbf{x} = \{-1.2, 0.5, 0.8, -0.3\}$.

What is the MLE for μ ? Round your answer to two decimal places.

-0.05

Correct

This is $(-1.2 + 0.5 + 0.8 - 0.3)/4$.