

<u>Lecture 9: Introduction to</u>

3. Likelihood of an Exponential

课程 □ Unit 3 Methods of Estimation □ Maximum Likelihood Estimation

Distribution

3. Likelihood of an Exponential Distribution Likelihood of an Exponential Distribution

Exercises

Let $(E,(\mathbb{P}_{\theta})_{\theta\in\Theta})$ be a statistical model associated with $X_1,\ldots,X_n\sim \mathsf{Exp}(\lambda)$.

- a) What is E?
- **b)** What is Θ ?
- c) Find the likelihood of the model.
- (Caption will be displayed when you start playing the video.)

Start of transcript. Skip to the end.

OK, so now let's do it for the--

sorry, let's do it for the exponential distribution.

What is E?

Yes.

Positive numbers.

Yeah, so it's 0, infinity.

Or I mean, I could put in a 0 or not, but it's 0, infinity.

What is theta?

视频

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Product of Indicators

1/1 point (graded)

Rewrite the product $\mathbf{1}$ $(x_1 \leq 5)$ $\mathbf{1}$ $(x_2 \leq 5)$ as a single indicator function. That is, find $f(x_1, x_2)$ in the following equation:

$$\mathbf{1}(x_1 \leq 5) \mathbf{1}(x_2 \leq 5) = \mathbf{1}(f(x_1, x_2) \leq 5).$$

(Choose all that apply.)

$$\quad \ \, \square \ \, f\left(x_{1},x_{2}\right)=x_{1}x_{2}$$

$$^{\square} \ f(x_1,x_2)=\frac{x_1+x_2}{2}$$

$$lacksquare f(x_1,x_2) = ext{sign}\left(x_1
ight) ext{sign}\left(x_2
ight)$$

$$otin f(x_1,x_2) = \max\left(x_1,x_2
ight) \square$$

$$lacksquare f(x_1,x_2)=\min\left(x_1,x_2
ight)$$

Solution:

We need to find $f\left(x_{1},x_{2}
ight)$ such that

$$f\left(x_{1},x_{2}
ight)\leq5\iff x_{1}\leq5 ext{ and }x_{2}\leq5$$

We go through the choices in order. We leave it to you to find counter examples:

- 1. $x_1, x_2 \leq 5$ does not imply $x_1x_2 \leq 5$;
- 2. $\frac{x_1+x_2}{2} \leq 5$ does not imply $x_1,x_2 \leq 5$;
- 3. $\operatorname{sign}(x_1)\operatorname{sign}(x_2) \leq 5$ for all $x_1,x_2,$ and in particular does not imply $x_1,x_2 \leq 5$;
- 4. $\max{(x_1,x_2)} \leq 5$ if and only if both $x_1,x_2 \leq 5$, so this is a valid choice for $f(x_1,x_2)$;
- 5. $\min(x_1, x_2) \leq 5$ implies one of x_1, x_2 to be at most 5 but not necessarily both.

提交

你已经尝试了1次 (总共可以尝试2次)

☐ Answers are displayed within the problem

讨论

显示讨论

主题: Unit 3 Methods of Estimation:Lecture 9: Introduction to Maximum Likelihood Estimation / 3. Likelihood of an Exponential Distribution

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