9. Exercise: A simple CI

Exercise: A simple CI

2/2 points (graded)

Let θ be an unknown parameter, and let X be uniform on the interval $[\theta - 0.5, \theta + 0.5]$.

Is $[X - 2, X + 2]$ an 80% confidence interval?

Yes ▼ ✔ **Answer:** Yes

I form a confidence interval of the form $[X - a, X + a]$. What is the narrowest confidence interval of this type (i.e., what is the smallest possible choice of a) if I want to have an 80% confidence interval?

$a =$ 0.4 ✔ **Answer:** 0.4

Solution:

$\mathbf{P}(X - 2 \leq \theta \leq X + 2) = \mathbf{P}(\theta - 2 \leq X \leq \theta + 2) = 1 \geq 0.80$, and therefore, it is a 80% confidence interval, although, admittedly not a very intelligent one.

Note that $\mathbf{P}(X - a \leq \theta \leq X + a) = \mathbf{P}(\theta - a \leq X \leq \theta + a) = 2a$, for $a \in [0, 0.5]$. In order to have an 80% confidence interval, I need $2a \geq 0.8$ or $a \geq 0.4$. Therefore, the smallest possible choice of a is 0.4.

提交 You have used 2 of 3 attempts

ℹ Answers are displayed within the problem

讨论

Topic: Unit 8 / Lec. 20 / 9. Exercise: A simple CI

显示讨论