9. Exercise: A simple CI

Exercises due May 1, 2020 05:29 IST *Completed*

Exercise: A simple CI

1/2 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?

$a =$ -0.5 ✖ **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.

Submit You have used 3 of 3 attempts

Answers are displayed within the problem

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☑	Ex : CI Hi, a) Just want to confirm if my understanding of CI in this problem is correct. Since X ~ U(a,b) in [Theta-...	3
☑	In the solution, how do you get 2a? I got this question correct using intuition, but I was wondering how to derive the 2a solution in the secon...	3
💬	trick question part 1 is a total trick question... but I guess it doesn't matter since we get 3 tries	1 new 7
?	Can someone please help me with how to solve this one? It doesn't look like we have to use normal tables. But I am really stuck on this one, i also rewatched last v...	10