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Lecture 5: Delta Method and

2. Confidence Intervals Concept

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> Checks

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2. Confidence Intervals Concept Checks

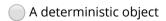
Confidence Interval Concept Check 1

1/1 point (graded)

Let $X_1,\ldots,X_n\stackrel{iid}{\sim}P_{ heta}$, where heta is an unknown parameter. You construct a **confidence interval** $\mathcal{I}=[a,b]$ for heta.

Complete the next sentence with one of the options below. The confidence interval $\ensuremath{\mathcal{I}}$ is ...

A random	object





Solution:

As defined, a confidence interval $\mathcal{I}=[a,b]$ for an unknown parameter θ is a *random* interval such that the expressions for its endpoints a,b do **not** depend on θ .

Remark 1: Let's write $a=f(X_1,\ldots,X_n)$ and $b=g(X_1,\ldots,X_n)$ for the endpoints of the random interval $\mathcal I$. Note that f and g are functions of the random sample that do not depend on θ . In practice, one uses data (e.g. realizations x_1,\ldots,x_n of the i.i.d. observations X_1,\ldots,X_n) to compute the *realization* $\mathcal I_{\mathrm{real}}$ of the confidence interval $\mathcal I$:

$$\mathcal{I}_{ ext{real}} := \left[f\left(x_1, \ldots, x_n
ight), g\left(x_1, \ldots, x_n
ight)
ight].$$

Remark 2: For this concept, it is important to distinguish the random variable \mathcal{I} (the confidence interval) from its realization \mathcal{I}_{real} , which can be formed only after collecting data.

Submit

You have used 1 of 1 attempt

• Answers are displayed within the problem

Note: The exercises on the next few pages will be presented in lecture, but we encourage you to attempt these by yourself first.

Confidence Interval Concept Check 2

1/1 point (graded)

Recall that a **realization** of a random variable X is the value that it takes when we observe X. For example, if $X \sim \mathrm{Ber}\,(1/2)$ and we observe the event X=1, then x=1 is the realization (observed value) of the random variable X.

Let \mathcal{I} , \mathcal{J} be some 95% and 98% asymptotic confidence intervals respectively for the unknown parameter p. Which of the following statements is true?

igcap Any realization of ${\mathcal I}$ is a **subinterval** of any realization of ${\mathcal J}.$

igcap Any realization of ${\mathcal J}$ is a **subinterval** of any realization of ${\mathcal I}$.

