

EdX and its Members use cookies and other tracking technologies for performance, analytics, and marketing purposes. By using this website, you accept this use. Learn more about these technologies in the [Privacy Policy](#).



[Course](#) > [Unit 2 Foundation of Inference](#) > [Lecture 5: Delta Method and Confidence Intervals](#)

2. Confidence Intervals Concept  
> Checks

### Audit Access Expires Dec 24, 2019

You lose all access to this course, including your progress, on Dec 24, 2019.

Upgrade by Nov 4, 2019 to get unlimited access to the course as long as it exists on the site. [Upgrade now](#)

## 2. Confidence Intervals Concept Checks

### Confidence Interval Concept Check 1

1/1 point (graded)

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

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

☒ A random object

☐ A deterministic object



**Solution:**

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

**Remark 1:** Let's write  $a = f(X_1, \dots, X_n)$  and  $b = g(X_1, \dots, X_n)$  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  $\theta$ . In practice, one uses data (e.g. realizations  $x_1, \dots, x_n$  of the i.i.d. observations  $X_1, \dots, X_n$ ) to compute the *realization*  $\mathcal{I}_{\text{real}}$  of the confidence interval  $\mathcal{I}$ :

$$\mathcal{I}_{\text{real}} := [f(x_1, \dots, x_n), g(x_1, \dots, x_n)].$$

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

Submit

You have used 1 of 1 attempt

**i** 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  $X \sim \text{Ber}(1/2)$  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?

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

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

☒ None of the above



Submit

You have used 2 of 2 attempts

✓ Correct (1/1 point)

## Discussion

Hide Discussion

**Topic:** Unit 2 Foundation of Inference:Lecture 5: Delta Method and Confidence Intervals / 2. Confidence Intervals Concept Checks

Add a Post

Show all posts ▼

by recent activity ▼

There are no posts in this topic yet.



Learn About Verified Certificates

© All Rights Reserved