3. Exercise: CLT

Exercise: CLT

2/2 points (graded)

Let X_n be i.i.d. random variables with mean zero and variance σ^2. Let $S_n = X_1 + \cdots + X_n$. Let Φ stand for the standard normal CDF. According to the central limit theorem, and as $n \to \infty$, $\mathbf{P}(S_n \leq 2\sigma\sqrt{n})$ converges to $\Phi(a)$, where:

$a =$ | 2 | ✔ **Answer:** 2

Furthermore,

$\mathbf{P}(S_n \leq 0)$ converges to: | 1/2 | ✔ **Answer:** 0.5

(Here, enter the numerical value of the probability.)

Solution:

We have

$$\lim_{n\to\infty} \mathbf{P}(S_n \leq 2\sigma\sqrt{n}) = \lim_{n\to\infty} \mathbf{P}\left(\frac{S_n - 0}{\sigma\sqrt{n}} \leq 2\right) = \Phi(2).$$

Similarly,

$$\lim_{n\to\infty} \mathbf{P}(S_n \leq 0) = \lim_{n\to\infty} \mathbf{P}\left(\frac{S_n - 0}{\sigma\sqrt{n}} \leq 0\right) = \Phi(0) = \frac{1}{2}.$$

提交   You have used 2 of 3 attempts

ⓘ Answers are displayed within the problem

讨论

Topic: Unit 8 / Lec. 19 / 3. Exercise: CLT

显示讨论