



MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▶ Unit 4: Discrete random variables
- ▶ Exam 1
- ▶ Unit 5: Continuous random variables

Unit 8: Limit theorems and classical statistics > Lec. 19: The Central Limit Theorem (CLT) > Lec 19 The Central Limit Theorem CLT vertical

Bookmark

Exercise: CLT

(2/2 points)

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 $n \rightarrow \infty$, $\mathbf{P}(S_n \leq 2\sigma\sqrt{n})$ converges to $\Phi(a)$, where:

 $a =$ Answer: 2

Furthermore,




$\mathbf{P}(S_n \leq 0)$ converges to: Answer: 0.5
(Here, enter the numerical value of the probability.)

Answer:


- ▶ Unit 6: Further topics on random variables
- ▶ Unit 7: Bayesian inference
- ▶ Exam 2
- ▼ **Unit 8: Limit theorems and classical statistics**

Unit overview


Lec. 18: Inequalities, convergence, and the Weak Law of Large Numbers

Exercises 18 due Apr 27, 2016
at 23:59 UTC 

Lec. 19: The Central Limit Theorem (CLT)

Exercises 19 due Apr 27, 2016
at 23:59 UTC 

Lec. 20: An introduction to classical statistics

Exercises 20 due Apr 27, 2016
at 23:59 UTC 

We have


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

Similarly,

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

You have used 1 of 2 submissions

[Solved problems](#)[Additional theoretical material](#)[Problem Set 8](#)

Problem Set 8 due Apr 27, 2016
at 23:59 UTC 

[Unit summary](#)

© All Rights Reserved



© edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

POWERED BY
OPENedX

