

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



- 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 > Problem Set 8 > Problem 1 Vertical: Convergence in probability

■ Bookmark

Problem 1: Convergence in probability

(6/6 points)

For each of the following sequences, determine the value to which it converges in probability.

(a) Let X_1, X_2, \ldots be independent continuous random variables, each uniformly distributed between -1 and 1.

$$^{1.}$$
 Let $U_i=rac{X_1+X_2+\cdots+X_i}{i},\quad i=1,2,\ldots$

What value does the sequence U_i converge to in probability?



2. Let $W_i = \max(X_1, X_2, \dots, X_i), \quad i = 1, 2, \dots$ What value does the sequence W_i converge to in probability?

- 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



3. Let $V_i=X_1\cdot X_2\cdot \cdots \cdot X_i,\quad i=1,2,\ldots$ What value does the sequence V_i converge to in probability?

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(b) Let X_1,X_2,\ldots be independent identically distributed random variables with ${f E}[X_i]=2$ and ${
m var}(X_i)=9$, and let $Y_i=X_i/2^i$.

1. What value does the sequence Y_i converge to in probability?



Let $A_n = rac{1}{n} \sum_{i=1}^n Y_i$. What value does the sequence A_n converge to in probability?



3.

Solved problems

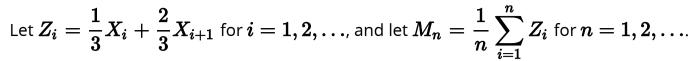
Additional theoretical material

Problem Set 8

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

Unit summary

Unit 9: Bernoulli and Poisson processes



What value does the sequence M_n converge to in probability?

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You have used 1 of 2 submissions

Printable problem set available here.

DISCUSSION

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Click "Show Discussion" below to see discussions on this problem.

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