



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



Bookmarks

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Bookmark

Exercise: More on fresh start

(1/1 point)

Consider a Bernoulli process with parameter $p = 1/3$. Let, as usual, T_1 stand for the time of the first success. We are told that the results of the two slots that follow the first success are failures, so that $X_{T_1+1} = X_{T_1+2} = 0$. What is the conditional expectation of the second interarrival time, T_2 , given this information? (Recall that the expectation of a geometric random variable with parameter p is equal to $1/p$.)



Answer: 5


Answer:

After time T_1 , we have two failures, and these are part of the interarrival time T_2 . Given this information, the process starts fresh at time $T_1 + 3$ and the number of trials from time $T_1 + 3$ onwards until the next success is geometric with parameter $1/3$, and has an expected value of 3. Therefore, the conditional expectation of T_2 , given the information we were given, is $2 + 3 = 5$.


- ▶ Unit 6: Further topics on random variables
- ▶ Unit 7: Bayesian inference
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- ▶ Unit 8: Limit theorems and classical statistics
- ▼ **Unit 9: Bernoulli and Poisson processes**

Unit overview

Lec. 21: The Bernoulli process


Exercises 21 due May 11, 2016 at 23:59 UTC 

Lec. 22: The Poisson process

Exercises 22 due May 11, 2016 at 23:59 UTC 

Lec. 23: More on the Poisson process


You have used 1 of 2 submissions

Exercises 23 due May 11, 2016
at 23:59 UTC 

Solved problems

**Additional theoretical
material**

Problem Set 9

Problem Set 9 due May 11,
2016 at 23:59 UTC 

Unit summary

► Unit 10: Markov
chains

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