



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 9: Bernoulli and Poisson processes > Lec. 23: More on the Poisson process > Lec 23 More on the Poisson process vertical

Bookmark

Exercise: The sum of Poisson r.v.'s

(1 point possible)

Consider a Poisson process with rate $\lambda = 1$. Consider three times that satisfy $0 < t_1 < t_2 < t_3$. Let M be the number of arrivals during the interval $[0, t_2]$. Let N be the number of arrivals during the interval $[t_1, t_3]$. Is the random variable $M + N$ guaranteed to be Poisson?

Yes ▼



Answer: No


Answer:

Because the two time intervals overlap, M and N are not independent and the result in the preceding video does not apply. Consider the extreme case where $t_1 \approx 0$ and $t_2 \approx t_3$. In that case, the two intervals almost coincide, and therefore $M = N$ with high probability. In that case, the PMF of $M + N$ is concentrated on the even integers, which cannot happen for a Poisson PMF.


- ▶ Unit 6: Further topics on random variables
- ▶ Unit 7: Bayesian inference
- ▶ Exam 2
- ▶ 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 1 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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