Exercise: At the coffee shop

(1/1 point)

As in an earlier exercise, busy people leave the park according to a Poisson process with rate $\lambda_1 = 3$/hour. Relaxed people leave the park according to an independent Poisson process with rate $\lambda_2 = 2$/hour. Each person, upon leaving the park, makes a decision whether to enter the nearby coffee shop. Each busy person decides to enter the coffee shop with probability $1/4$. Each relaxed person decides to enter the coffee shop with probability $1/2$. The decisions of different persons are independent, and also independent from all other aspects of the Poisson processes that define this model. Assume that no other people enter the coffee shop.

Is the process of arrivals at the coffee shop (people entering the coffee shop) a Poisson process? If yes, enter below its rate. If not, enter 0.

7/4 ✔

Answer: 1.75

Answer:

From our discussion of splitting, we see that busy people who enter the coffee shop form a Poisson process with rate $3 \cdot (1/4)$. Similarly, relaxed people who enter the coffee shop form a Poisson process with rate $2 \cdot (1/2)$. Because of our independence assumptions, these two Poisson processes are independent. The process of arrivals at the coffee shop corresponds to the merging of these two processes and is therefore Poisson with rate $3/4 + 1 = 7/4$.

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