10. Exercise: Lightbulb burnouts

Exercise: Lightbulb burnouts

1/1 point (graded)

As in the preceding video, consider three lightbulbs each of which has a lifetime that is an independent exponential random variable with parameter $\lambda = 1$. The variance of the time until all three burn out is:

49/36 ✔ **Answer:** 1.36111

Recall that the variance of an exponential with parameter λ is $1/\lambda^2$.

Solution:

As we discussed, the time until all three lighbulbs burn out is the sum of an exponential random variable with parameter 3λ, an exponential random variable with parameter 2λ, and an exponential random variable with parameter λ. Furthermore, because of the fresh-start property, we argued that these three random variables are independent. Therefore, since $\lambda = 1$, the variance is

$$\frac{1}{3^2} + \frac{1}{2^2} + \frac{1}{1^2} = \frac{49}{36}.$$

提交 你已经尝试了1次（总共可以尝试3次）

Answers are displayed within the problem

讨论

显示讨论

主题： Unit 9 / Lec. 23 / 10. Exercise: Lightbulb burnouts