8. Poisson fun

Problem Set due May 13, 2020 05:29 IST *Past Due*

Problem 8. Poisson fun

2 points possible (graded)

Based on your understanding of the Poisson process, determine the numerical values of a and b in the following expression.

$$\int_t^{\infty} \frac{\lambda^6 \tau^5 e^{-\lambda\tau}}{5!}\, d\tau = \sum_{k=a}^{b} \frac{(\lambda t)^k e^{-\lambda t}}{k!}.$$

$a =$ Answer: 0

$b =$ Answer: 5

Solution:

The left-hand side is the probability that an Erlang random variable of order 6 and rate λ is larger than t. In the language of Poisson processes, this is the probability that there were at most 5 arrivals during the interval $(0, t]$ (recall that an n^{th} order Erlang random variable corresponds to the n^{th} arrival time in a Poisson process. Hence, $a = 0$, and $b = 5$.

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Answers are displayed within the problem

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