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Unit overview

Lec. 11: Derived distributions

Exercises 11 due Mar 30, 2016 at 23:59 UTC

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Derived distributions vertical2

Bookmark

Exercise: PDF of a general function

(1/2 points)

The random variable X has a PDF of the form

$$f_X(x) = \begin{cases} \frac{1}{x^2}, & \text{for } x \geq 1, \\ 0, & \text{otherwise.} \end{cases}$$

Let $Y = X^2$. For $y \geq 1$, the PDF of Y it takes the form $f_Y(y) = \frac{a}{y^b}$. Find the values of a and b .

 $a =$ 

Answer: 0.5

 $b =$ 

Answer: 1.5

Answer:

For any $y \geq 1$, we have

$$F_Y(y) = \mathbf{P}(Y \leq y) = \mathbf{P}(X^2 \leq y) = \mathbf{P}(X \leq \sqrt{y}) = F_X(\sqrt{y}).$$

By differentiating and using the chain rule, we have

$$f_Y(y) = \frac{1}{2\sqrt{y}} f_X(\sqrt{y}) = \frac{1}{2y^{1.5}}.$$

You have used 2 of 2 submissions

Lec. 12: Sums of independent r.v.'s; Covariance and correlation

Exercises 12 due Mar 30, 2016 at 23:59 UTC

Lec. 13: Conditional expectation and variance revisited; Sum of a random number of independent r.v.'s

Exercises 13 due Mar 30, 2016 at 23:59 UTC

Solved problems

Additional theoretical material

Problem Set 6

Problem Set 6 due Mar 30, 2016 at 23:59 UTC

Unit summary

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