



Bookmarks

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Unit overview

Lec. 11: Derived distributions

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

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

Unit 6: Further topics on random variables > Lec. 12: Sums of independent r.v.'s; Covariance and correlation > Lec 12 Sums of independent r v s Covariance and correlation vertical3



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Exercise: Covariance calculation

(1/1 point)

Suppose that X , Y , and Z are independent random variables with unit variance. Furthermore, $\mathbf{E}[X] = 0$ and $\mathbf{E}[Y] = \mathbf{E}[Z] = 2$. Then,

$$\text{cov}(XY, XZ) =$$

4



Answer: 4

Answer:

Because of independence and the zero-mean assumption, it follows that

 $\mathbf{E}[XY] = \mathbf{E}[X] \cdot \mathbf{E}[Y] = 0$ and similarly, $\mathbf{E}[XZ] = 0$. Thus,

$$\text{cov}(XY, XZ) = \mathbf{E}[XYXZ] = \mathbf{E}[X^2YZ] = \mathbf{E}[X^2] \cdot \mathbf{E}[Y] \cdot \mathbf{E}[Z] = \text{var}(X) \cdot \mathbf{E}[Y] \cdot \mathbf{E}[Z]$$

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