9. Exercise: Covariance calculation

Exercise: Covariance calculation

1/1 point (graded)

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,

$\mathsf{Cov}(XY, XZ) =$ 4 ✔ **Answer:** 4

Solution:

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,

$$\mathsf{Cov}(XY, XZ) = \mathbf{E}[XYXZ] = \mathbf{E}[X^2YZ] = \mathbf{E}[X^2] \cdot \mathbf{E}[Y] \cdot \mathbf{E}[Z] = \mathsf{Var}(X) \cdot \mathbf{E}[Y] \cdot \mathbf{E}[Z] = 4.$$

提交 You have used 3 of 3 attempts

Answers are displayed within the problem

讨论

显示讨论

Topic: Unit 6 / Lec. 12 / 9. Exercise: Covariance calculation