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,

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

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

You have used 1 of 2 submissions