3. Exercise: Markov inequality

Exercises due May 1, 2020 05:29 IST *Completed*

Exercise: Markov inequality

1/1 point (graded)

Let Z be a nonnegative random variable that satisfies $\mathbf{E}\left[Z^4\right] = 4$. Apply the Markov inequality to the random variable Z^4 to find the tightest possible (given the available information) upper bound on $\mathbf{P}\left(Z \geq 2\right)$.

$\mathbf{P}\left(Z \geq 2\right) \leq$ 1/4 ✔ **Answer:** 0.25

Solution:

We have

$$\mathbf{P}\left(Z \geq 2\right) = \mathbf{P}\left(Z^4 \geq 16\right) \leq \frac{\mathbf{E}\left[Z^4\right]}{16} = \frac{4}{16} = \frac{1}{4}.$$

Submit You have used 2 of 3 attempts

Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Unit 8: Limit theorems and classical statistics:Lec. 18: Inequalities, convergence, and the Weak Law of Large Numbers / 3. Exercise: Markov inequality

Show all posts | by recent activity

- Another Hint
  Start with thinking about how (Z>=2) relates to Z^4. After that apply the Markov inequality. — 3
- Hint — 4
- For those with less intuition (like me) — 5
- Utilize a trick to get an answer but which one? — 7
- Watch the next video for some hint
  Like many questions encountered so far, the hint for this question is in the video after it. — 8
- I'm at a loss on this one...I reason we must relate E[Z^4] to E[Z] but I don't see a method to do so. Was this covered at some point in the course? Can someone tell me what unit/lectures are relevant? Thanks
  Need help...what unit/lectures relevant? — 6

© All Rights Reserved