



Bookmarks



Bookmark

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▶ Unit 4: Discrete random variables
- ▶ Exam 1
- ▶ Unit 5: Continuous random variables
- ▼ Unit 6: Further topics on random variables

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;

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 vertical5

Exercise: The variance of a sum

(1 point possible)

The random variables X_1, \dots, X_8 satisfy $\mathbf{E}[X_i] = 1$ and $\mathbf{var}(X_i) = 4$ for $i = 1, 2, \dots, 8$. Also, for $i \neq j$, $\mathbf{E}[X_i X_j] = 3$. Then,



$\mathbf{var}(X_1 + \dots + X_8) =$ ✗ Answer: 144

Answer:

For $i \neq j$, we have
$$\mathbf{cov}(X_i, X_j) = \mathbf{E}[X_i X_j] - \mathbf{E}[X_i] \cdot \mathbf{E}[X_j] = 3 - 1 = 2.$$
 Thus,

$$\mathbf{var}(X_1 + \dots + X_8) = 8 \cdot \mathbf{var}(X_1) + 56 \cdot \mathbf{cov}(X_1, X_2) = 32 + 112 = 144.$$

You have used 2 of 2 submissions

**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**

© All Rights Reserved



© edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

POWERED BY
OPENedX