

MITx: 6.041x Introduction to Probability - The Science of Uncertainty

■ Bookmarks

Unit 0: Overview

- EntranceSurvey
- Unit 1: Probability models and axioms
- Unit 2: Conditioning and independence
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Unit overview

Lec. 11: Derived distributions
Exercises 11 due Mar

30, 2016 at 23:59 UT 🗗

Unit 6: Further topics on random variables > Problem Set 6 > Problem 6 Vertical: Correlation coefficients

■ Bookmark

Problem 6: Correlation coefficients

(6/6 points)

Consider the random variables X, Y and Z, which are given to be pairwise uncorrelated (i.e., X and Y are uncorrelated, X and Z are uncorrelated, and Y and Z are uncorrelated). Suppose that

•
$$\mathbf{E}[X] = \mathbf{E}[Y] = \mathbf{E}[Z] = 0$$
,

•
$$\mathbf{E}[X^2] = \mathbf{E}[Y^2] = \mathbf{E}[Z^2] = 1$$
,

•
$$\mathbf{E}[X^3] = \mathbf{E}[Y^3] = \mathbf{E}[Z^3] = 0$$

•
$$\mathbf{E}[X^4] = \mathbf{E}[Y^4] = \mathbf{E}[Z^4] = 3$$
.

Let $W=a+bX+cX^2$ and V=dX, where a,b,c, and d are constants, all greater than 0.

Find the correlation coefficients ho(X-Y,X+Y), ho(X+Y,Y+Z), ho(X,Y+Z) and ho(W,V).

1.
$$\rho(X-Y,X+Y) = \boxed{0}$$

2.
$$\rho(X+Y,Y+Z) = \boxed{1/2}$$

3.
$$\rho(X,Y+Z) = \boxed{0}$$

4.
$$ho(W,V)=$$

$$\odot \qquad rac{b}{\sqrt{b^2 + c^2}}$$

$$\bigcirc \qquad rac{b^2}{\sqrt{b^2 + 2c^2}}$$

Lec. 12: Sums of independent r.v.'s; Covariance and correlation

Exercises 12 due Mar 30, 2016 at 23:59 UT

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 UT

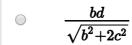
Solved problems

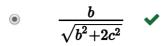
Additional theoretical material

Problem Set 6

Problem Set 6 due Mar 30, 2016 at 23:59 UT

Unit summary





You have used 1 of 2 submissions

DISCUSSION

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