



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



Bookmarks

- ▶ Unit 0:
Overview
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Probability
models and
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Unit overview

Lec. 8: Probability
density functionsExercises 8 due Mar
16, 2016 at 23:59 UTCLec. 9:
Conditioning on an
event; Multiple
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Unit 5: Continuous random variables > Lec. 10: Conditioning on a random variable;
Independence; Bayes' rule > Lec 10 Conditioning on a random variable Independence
Bayes rule vertical7



Bookmark

Exercise: Independent normals

(4/4 points)

The random variables X and Y have a joint PDF of the form

$$f_{X,Y}(x,y) = c \cdot \exp\left\{-\frac{1}{2}(4x^2 - 8x + y^2 - 6y + 13)\right\}.$$

 $\mathbf{E}[X] =$

1



Answer: 1

 $\mathbf{var}(X) =$

1/4



Answer: 0.25

 $\mathbf{E}[Y] =$

3



Answer: 3

 $\mathbf{var}(Y) =$

1



Answer: 1

Answer:

We rewrite the joint PDF in the form

$$f_{X,Y}(x,y) = c \cdot \exp\left\{-\frac{1}{2}\left(\frac{(x-1)^2}{1/4} + (y-3)^2\right)\right\},$$

and we recognize that we are dealing with the joint PDF of two independent normals with $\mathbf{E}[X] = 1$, $\mathbf{var}(X) = 1/4$, $\mathbf{E}[Y] = 3$, and $\mathbf{var}(Y) = 1$.

You have used 1 of 2 submissions

Lec. 10:
Conditioning on a
random variable;
Independence;
Bayes' rule

Exercises 10 due Mar
16, 2016 at 23:59 UTC

Standard normal
table

Solved problems

Problem Set 5

Problem Set 5 due Mar
16, 2016 at 23:59 UTC

Unit summary

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