ASTU PCE6205 Stochastic\_ Section1 Midterm exam 2020/12/29

1. Let’s denote the event of active covid-19 as and of the high temperature . And the joint probability as

Answer the followings

* 1. What is the probability of the temperature high ?

**Sol**:

* 1. What is the conditional probability ?

**Sol:**

* 1. What is the conditional probability

**Sol:**

1. Let x be an random variable, Calculate the following questions.

2.1 is a uniformly distributed random variable and its probability density function is

find the and

Sol:

* 1. The variance

First

Hence

2.2 is a exponentially distributed random variable and its probability density function is

find the and

Sol:

Then using the integral formula as

Hence

1. The variance

First

Where the integral is

Let

Hence

1. Let are independent random variables. Define the sum of two random variables as

And their corresponding probability density functions are given as

Sol: The joint probability density plot with respect to

x

y

* 1. Find the pdf of

Sol:

* 1. Find the joint pdf

1. For
2. For
   1. Find the conditional pdf

Since

1. For
2. For
   1. Find

Sol:

1. For
2. For
   1. Draw the with respect to

z

-1/2

3/2

1

* 1. Verify

Sol:

And from

Hence

- the End –

ASTU PCE6205 Stochastic\_ Section2 Midterm exam 2020/12/31

1. Let’s denote the event of active covid-19 as and of the high temperature . And the joint probability as

Answer the followings

* 1. What is the probability of the temperature high ?

**Sol**:

* 1. What is the conditional probability ?

**Sol:**

* 1. What is the conditional probability

**Sol:**

1. has the probability density function as,

* 1. Calculate

Sol:

* 1. Calculate

Sol:

Hence

Therefore

1. Let are independent random variables. Define the sum of two random variables as

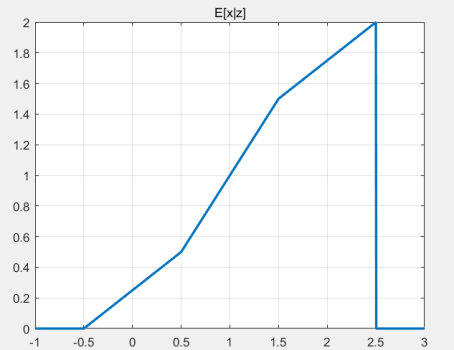
And corresponding probabilities are given in the following table

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | 0 | 0 | 0 |
|  | 1/2(z+1/2) |  |  |
|  | 1/2 |  | 1 |
|  | 1/2(5/2-z) |  |  |
|  | 0 | 0 | 0 |

* 1. Find

Sol:

1. For
2. For
3. For
   1. Draw the with respect to



* 1. Verify

Sol:

1. First
2. Second
3. From a) and b)
   1. If the random variable has the probability density function as

Draw the based on your engineering guess(You do not need to get all the pdf as in the table.

Sol: Let us consider

1. Assume in this case the range of and , hence the graph is
2. Now . Since

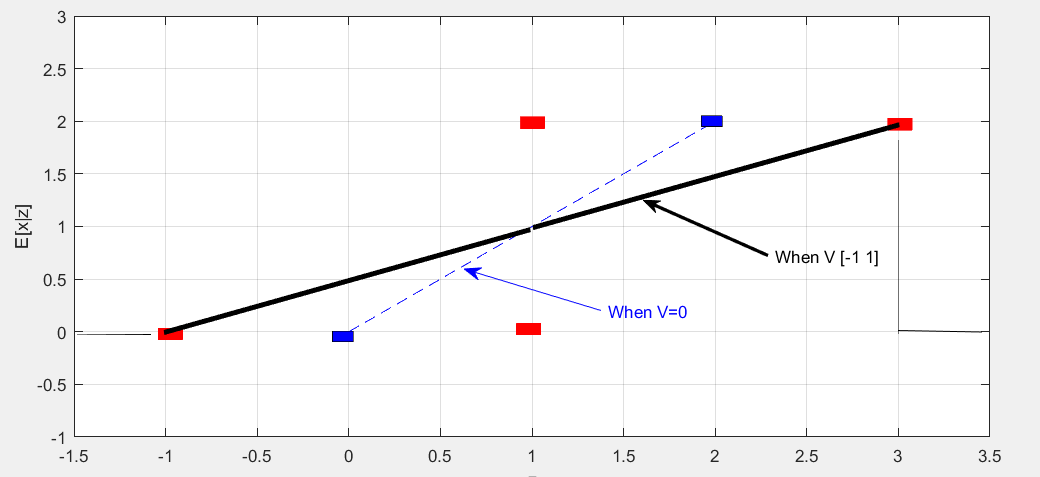
If ,

And then

If due to , the range of .

And the pdf of is uniform,

At , then and at



1. Now . Due to , the range of -