* Convolution

Consider independent two random variables . Define a new random variable

Find the pdf of in terms of

1. Solution

Now

( or respect to y, )

* Example

The sum of two X,Y, . Find

1. Using convolution
2. Convoiultion

Since is plotted in the following (for fixed , variable x )

z-1

z

x

Hence with the different , is

z-1

z

x

z-1

z

x

z-1

z

x

z-1

z

x

1. ,

1. In summary
2. Without using convolution

Since are independent , , the joint pdf is a rectagular as the following figure.The new RV

X

Y

z = x+y

The new RV , its probability , is

1. If ,
2. If
3. If

The double integral is

Combining yields

1. If

The pdf of is

Which is equivalent to that of using convolution.

%% HW\_4.1 double integral

Find the mass of the circle with radius a.

x

y

Mass =