Analog & Digital Communication (ET3172)

Assignment – 03 (MATLAB)

NAME : **AMIT BARMAN**
ENROLLMENT NO **: 2021ETB019**

Qs – 01>

```
clear all
clc
% uniform distributed random-exp histogram
y = randi([-5,5],10000,1);
histogram(y,50,'Normalization','pdf');
```

By changing " pdf " to " cdf " [last line] we can get both the histogram plot.

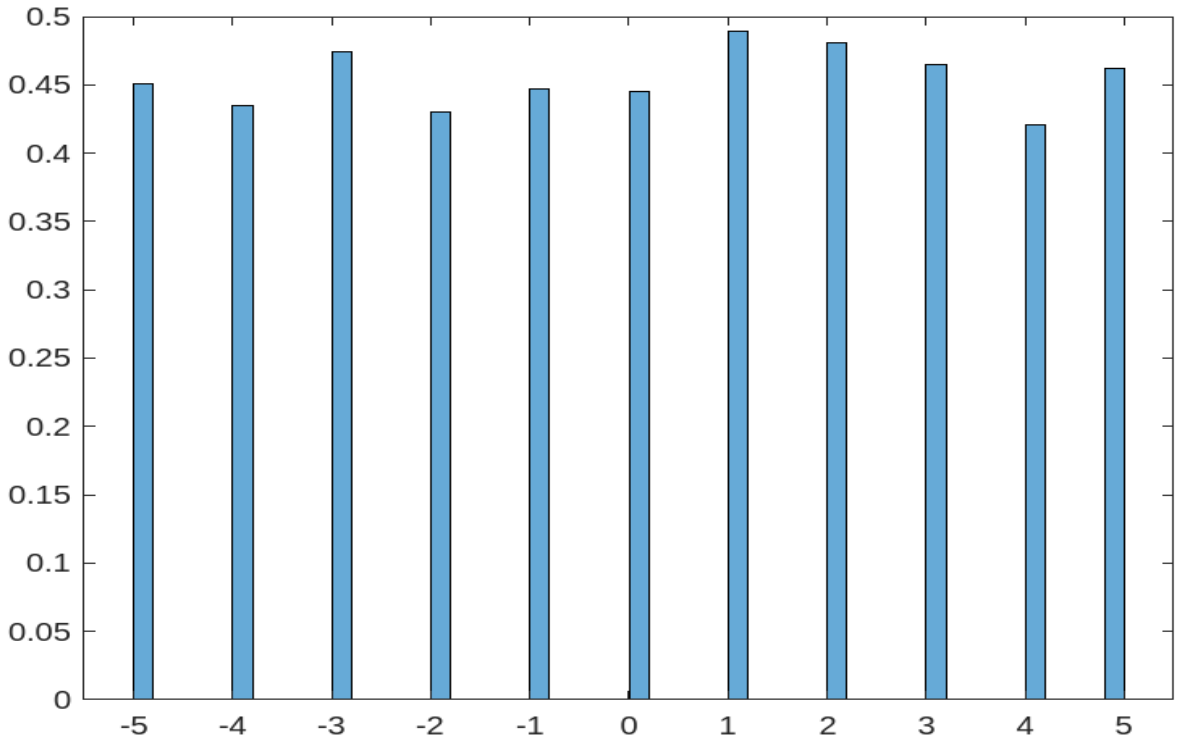

Fig: 1 - Histogram plot for Probability density function (pdf) from uniform distributed samples

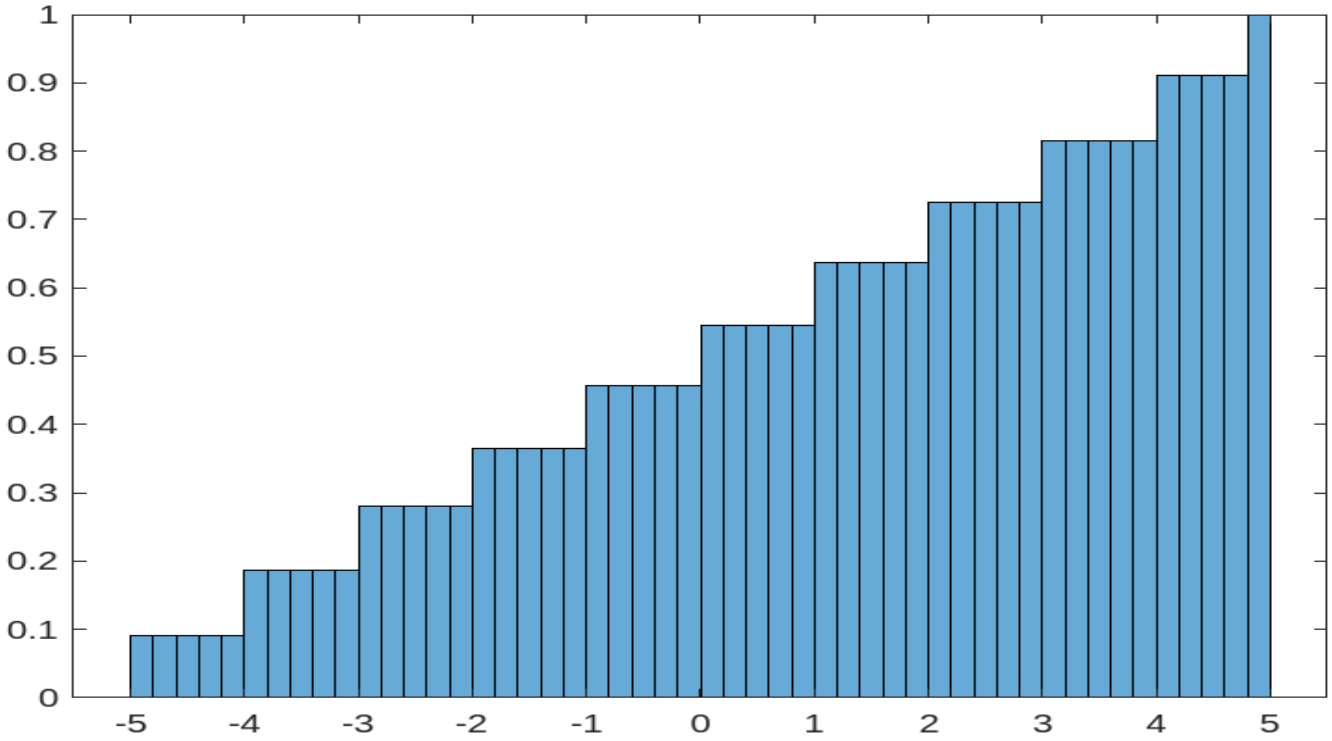

Fig : 2 - Histogram plot for Cumulative Distribution Function (cdf) from uniform distributed samples

Qs – 02>

```
clear all
clc
for x = 1:10000
    d(x) = round(rand(1));
end
histogram(d,'Normalization','pdf');
```

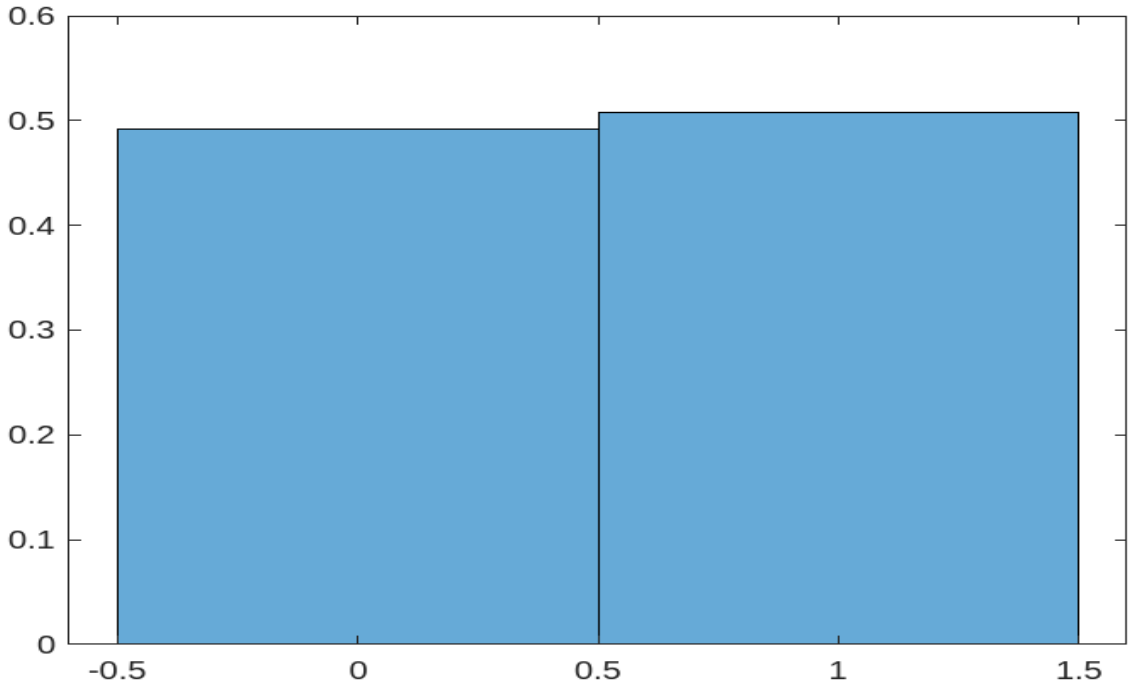

Fig : 3 - Histogram plot of binary samples from uniform distributed samples

Qs – 03>

```
clear all
clc
x_max = 4;
x_min = 1;
x = normrnd(0,1,10000,1);
% scaling
y=x_min+(x_max - x_min)*((x - min(x))/(max(x)-min(x)));
histogram(y,100,'Normalization','cdf');
```

By changing “ pdf ” to “ cdf ” [last line] we can get both the histogram plot.

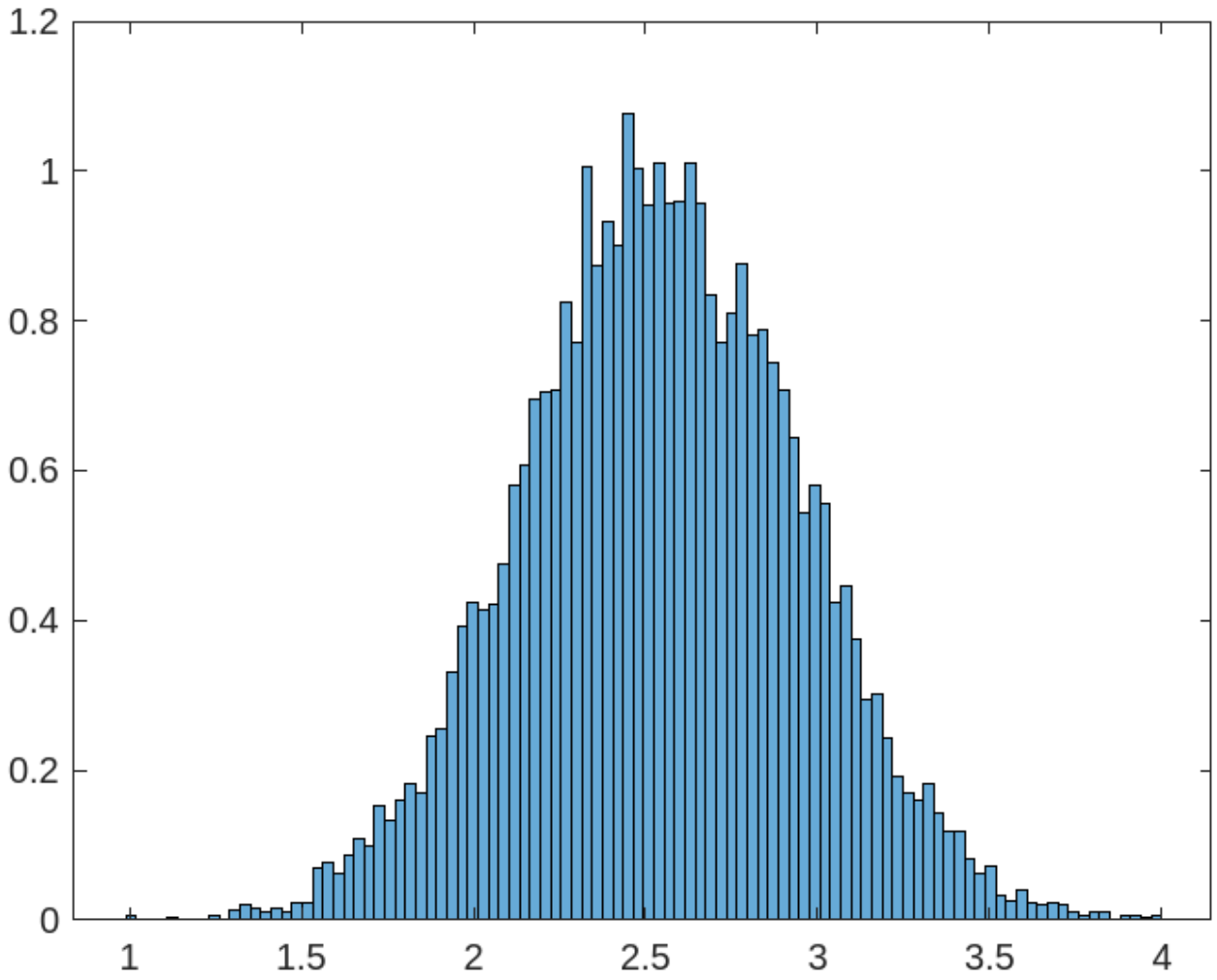

Fig : 4 - Histogram plot for pdf from gaussian distributed samples

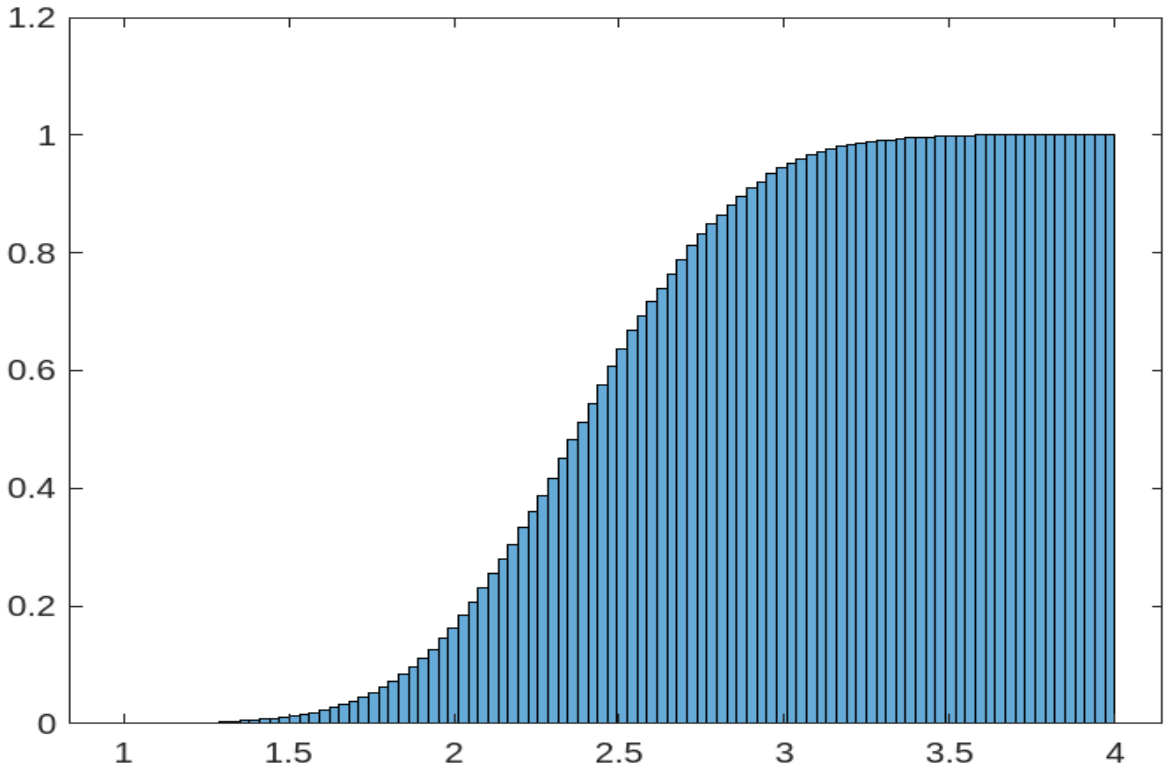

Fig : 5 - Histogram plot for cdf from gaussian distributed samples

Qs – 04 >

```
clear all
clc
x = exprnd(700,100,1);
histogram(x,20,'Normalization','cdf');
```

By changing “ pdf ” to “ cdf ” [last line] we can get both the histogram plot.

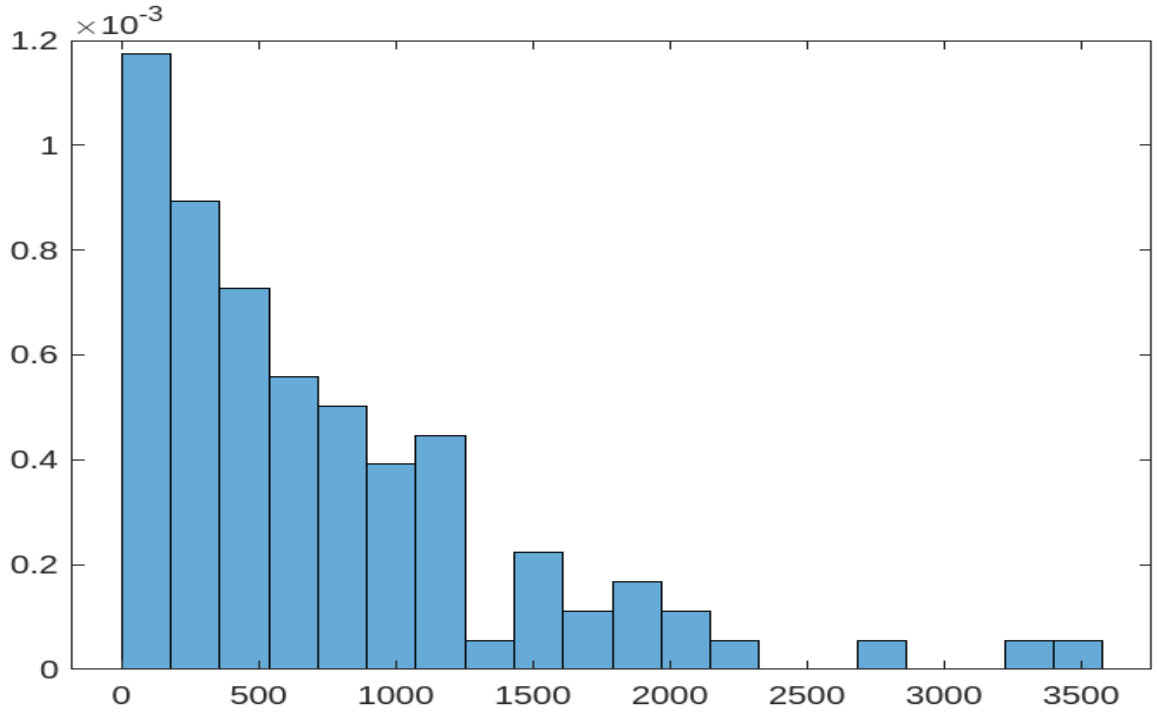

Fig : 6 - Histogram plot for pdf from exponentially distributed samples

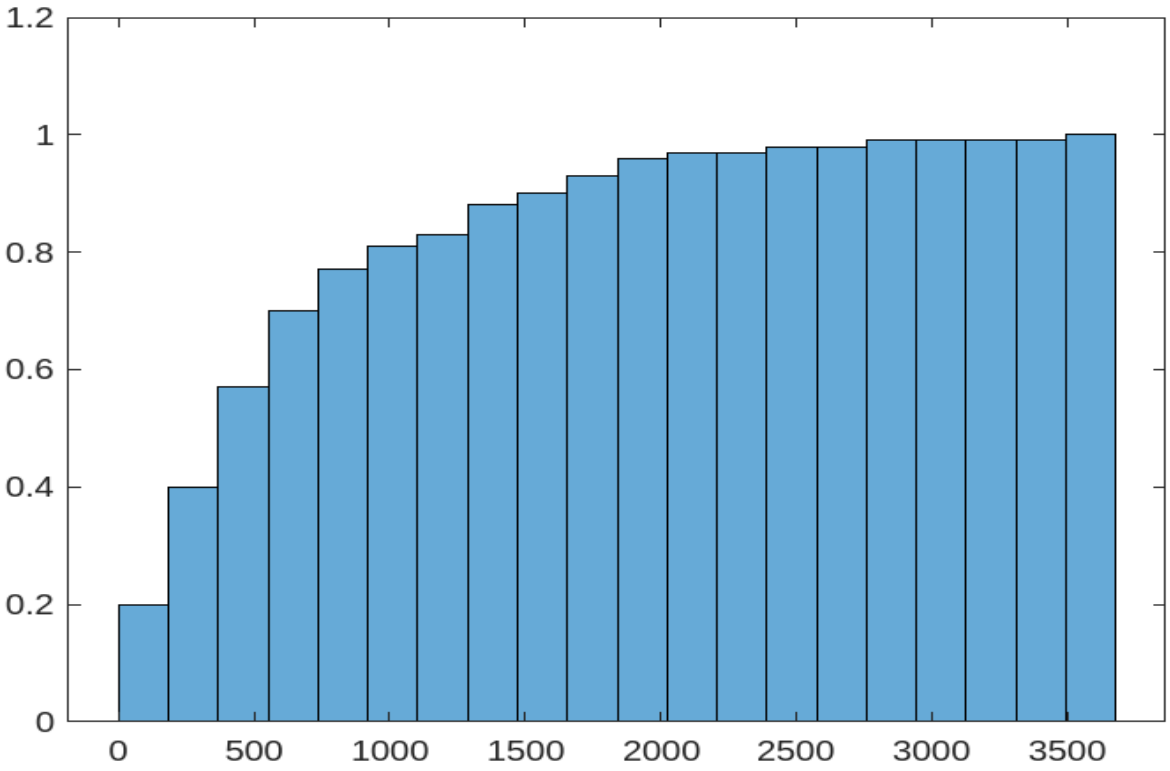

Fig : 7 - Histogram plot for cdf from exponentially distributed samples

Qs – 05>

```
clear all
clc
% randsrc
x = randsrc(10000,1);
histogram(x,2,'Normalization','cdf');
```

By changing “ pdf ” to “ cdf ” [last line] we can get both the histogram plot.

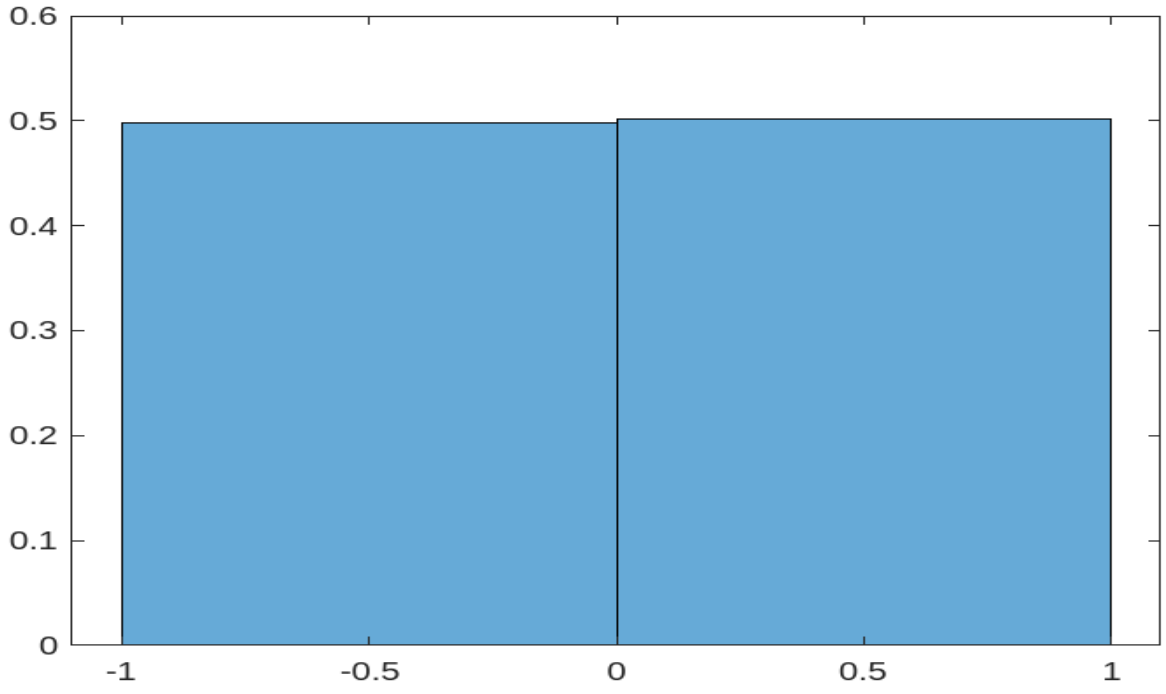

Fig : 8 - Histogram plot for pdf from uniform distributed binary samples(without for loop)

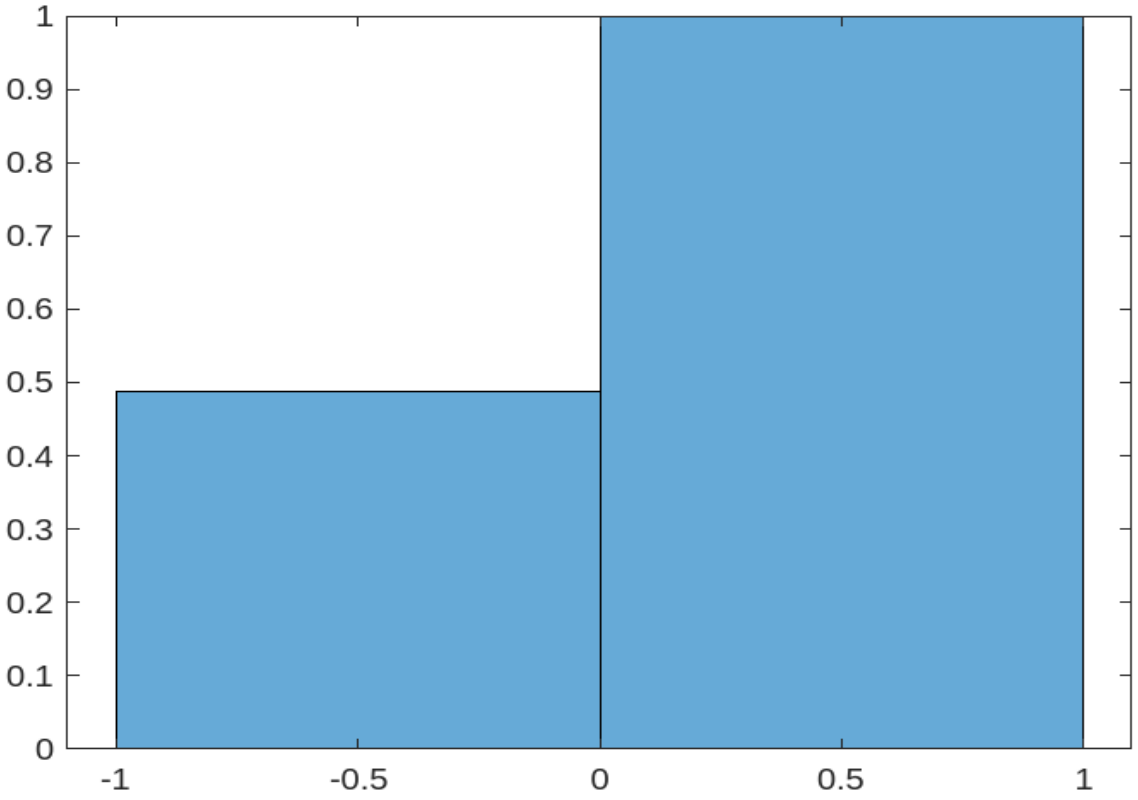

Fig : 9 - Histogram plot for cdf from uniform distributed binary samples(without using loop)

Qs – 06>

let x be a uniform random variable in [0,1] & let y = 2x +3 . Calculate the PDF of x . Find the PDF of y in terms of x. Add the PDF of y and x together in matlab or equivalent.

```
clear all
clc

% here range is big to show in proper range of pdf
x = -1:0.05:6;
p1 = makedist('Uniform','lower',0,'upper',1);
pdf1 = pdf(p1,x);
y = 2.* x + 3;
p2 = makedist('Uniform','lower',3,'upper',5);
pdf2 = pdf(p2,x);

stem(x, pdf1,'r');
hold on
stem(x, pdf2, 'g');
plot(x, pdf1+pdf2, 'b','LineWidth',2);
legend('pdf(x)','pdf(y) in terms of x','pdf(x)+pdf(y)'
```

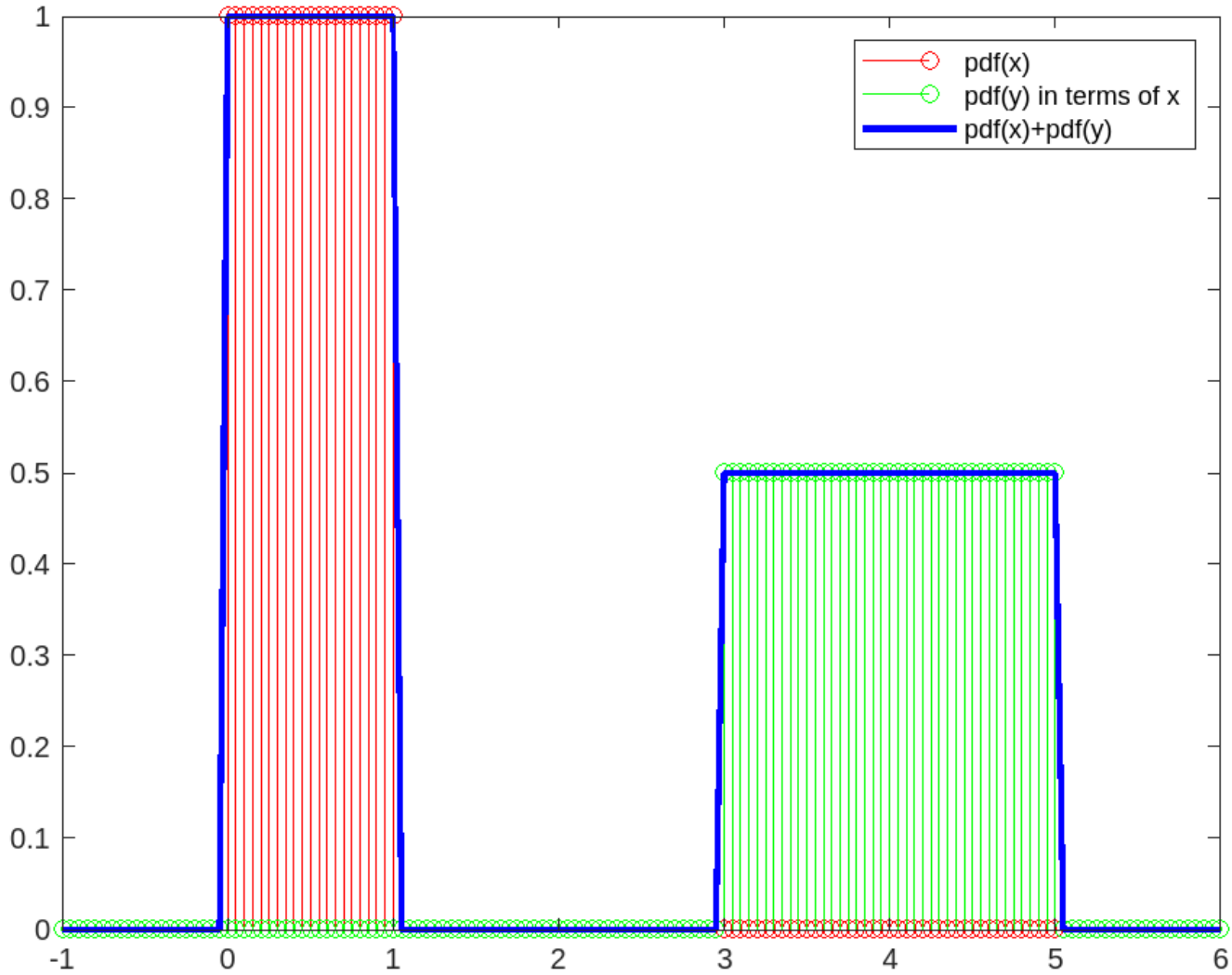

Fig : 10 – PDF of x & y and sum of PDF x & y