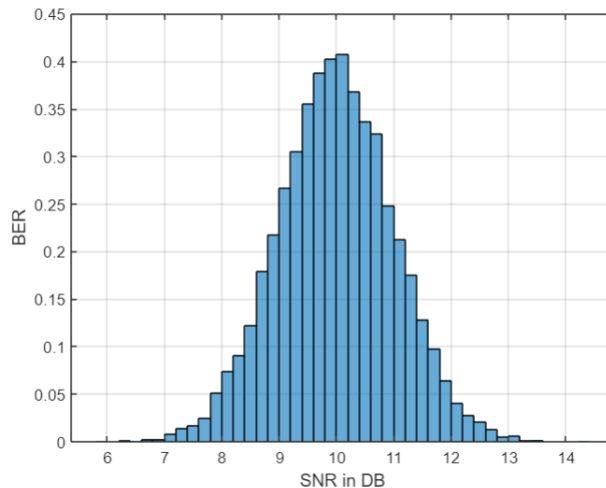


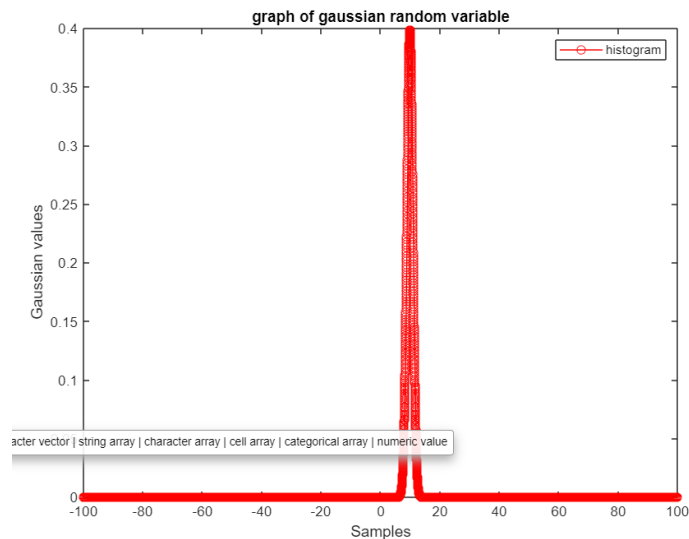
WIRELESS LAB ASSIGNMENT 1

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ECE

1- Write a MATLAB program to generate samples of a gaussian distribution and plot the probability density function(PDF) using the histogram method. Validate the above practical pdf curve by superimposing a plot generated using the theoretical PDF expression. Consider the generalised gaussian with a mean μ and variance σ^2 ?

```
clc;  
close all;  
clear all;  
N=10^4;%no. of samples  
mu=10;%mean  
sigma2=1;%variance  
x=sqrt(sigma2)*randn(1,N)+mu;  
histogram(x,'normalization','pdf');  
grid on;  
xlabel('SNR in DB');  
ylabel('BER');  
%theoretical expression  
range=-100:0.01:100;  
theo_exp=(1/sqrt(2*pi*sigma2))*exp(-((range-mu).^2)./(2*sigma2));  
hold on;  
figure(),plot(range,theo_exp,'r-o');  
xlabel('SNR in db');  
ylabel('BER');
```



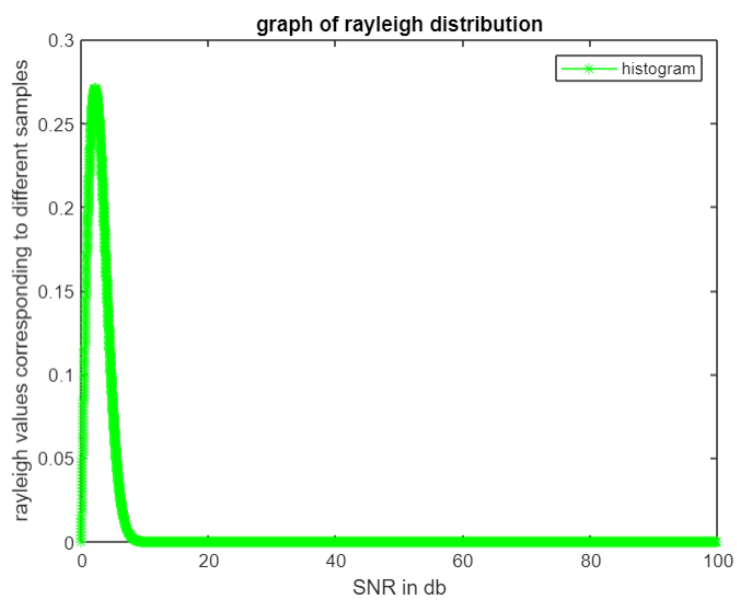
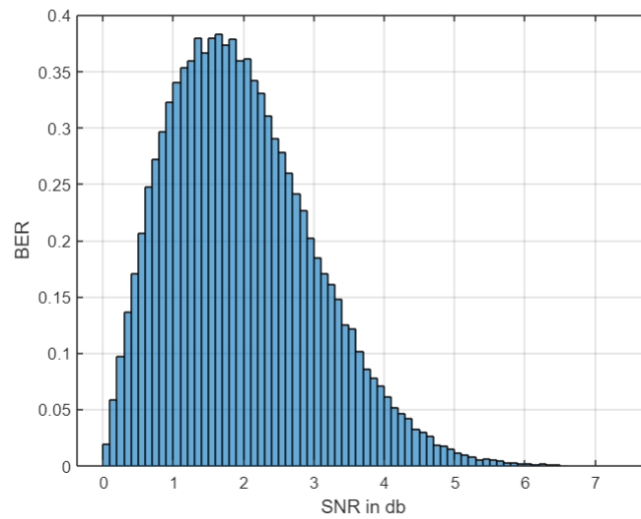


Observations-

The plot for practical and theoretical probability distribution function of gaussian were obtained.

2-Repeat 1 for rayleigh and rician distribution as well. Vary the fading parameter K and observe what limiting condition does the rician distribution approach the rayleigh and the gaussian distribution.

```
clc
close all
clear all
%rayleigh
sigmah2=5;
N=100000;
p=sqrt(sigmah2/2)*randn(1,N);
q=sqrt(sigmah2/2)*randn(1,N);
h=p+1j*q;
a=abs(h);
figure(),histogram(a,'Normalization','pdf');
grid on;
xlabel('SNR in db');
ylabel('BER');
%theoretical pdf curve
range2=0:0.01:100;
theo_exp2=(range2./sigmah2).*exp(-(range2.^2)./(2*sigmah2));
figure(),plot(range2,theo_exp2,'g-*');
xlabel('SNR in db');
ylabel('rayleigh values corresponding to different samples');
title('graph of rayleigh distribution');
legend('histogram','theoretical expresseion');
```



Observation:-

The plot for theoretical and practical probability distribution function rayleigh were obtained.