**Text, letter

Description automatically generated**

**Text, letter

Description automatically generated**

**Implementation of Log Normal Fading**

clc;

clear;

ABER=[];

ERa=[];

for SNR\_dB = 0:2.5:30

SNR = 10^(SNR\_dB/10);

b=0;

BErrora=0;

m=4;

for sample=1:10^6

H=exp(randn(1));

d=rand(1)>0.5;%BPSK

x=2\*d-1;

sd=sqrt(1/10^(SNR\_dB/10)); %standard deviation of noise

E=sd\*(randn(1)+1i\*randn(1)); %Additive white gaussian noise prototype

y=H\*x+E;

rx=y/H;

est = real(rx)>0;

if(est-d~=0)

b=b+1;

end

ber=qfunc(abs(H)\*(sqrt(SNR)));

BErrora=BErrora+ber;

end

ABER = [ABER b/sample];

ERa=[ERa BErrora/sample];

end

SNR\_dB=0:2.5:30;

SNR=10.^(SNR\_dB/10);

semilogy(SNR\_dB,ABER,'-c');

hold on

semilogy(SNR\_dB,ERa,'\*k');

legend("Practical BER","Analytical BER")

title("Log Normal Fading")

xlabel("SNR(dB)")

ylabel("BER")

grid on

hold off

Chart

Description automatically generated

**Implementation of Nakagami-m Fading**

clc;

clear;

ABER=[];

ERa=[];

for SNR\_dB = 0:2.5:30

SNR = 10^(SNR\_dB/10);

b=0;

BErrora=0;

m=4;

for sample=1:10^6

H=sqrt(gamrnd(m,1/m,1));%alpha=m , beta = 1/m and mean = 1

d=rand(1)>0.5;%BPSK

x=2\*d-1;

sd=sqrt(1/10^(SNR\_dB/10)); %standard deviation of noise

E=sd\*(randn(1)+1i\*randn(1)); %Additive white gaussian noise prototype

y=H\*x+E;

rx=y/H;

est = real(rx)>0;

if(est-d~=0)

b=b+1;

end

ber=qfunc(abs(H)\*(sqrt(SNR)));

BErrora=BErrora+ber;

end

ABER = [ABER b/sample];

ERa=[ERa BErrora/sample];

end

SNR\_dB=0:2.5:30;

SNR=10.^(SNR\_dB/10);

semilogy(SNR\_dB,ABER,'-c');

hold on

semilogy(SNR\_dB,ERa,'\*k');

legend("Practical BER","Analytical BER")

title("Nakagami-m Fading")

xlabel("SNR(dB)")

ylabel("BER")

grid on

hold off

**Chart

Description automatically generated**