clc;

clear all;

close all;

pkg load communications

N=1000;

mlevel=4;

k=log2(mlevel);

% signal generation in bit stream

x=randi([0,1],N,1);

% convert bit stream into symbol stream

xsym=bi2de(reshape(x,k,length(x)/k).','left-msb');

% modulation

xmod=qammod(xsym,mlevel);

%loop through diffrent SNR value

snr\_values=0:50;

ber\_values=zeros(size(snr\_values));

for idx=1:length(snr\_values)

SNR=snr\_values(idx);

% adding AWGN

Tx\_awgn=awgn(xmod,SNR,'measured');

% recived signal

Rx\_x=Tx\_awgn;

% demodulation

Rx\_x\_demod=qamdemod(Rx\_x,mlevel);

z=de2bi(Rx\_x\_demod,'left-msb');

Rx\_x\_BitStream=reshape(z.',prod(size(z)),1);

% calculation of BER

[number\_of\_errors,bit\_error\_rate]=biterr(x,Rx\_x\_BitStream);

ber\_values(idx)=bit\_error\_rate;

end

% Plot BER vs. SNR

figure;

semilogy(snr\_values,ber\_values,'bo-');

grid on;

xlabel('SNR (dB)');

ylabel('Bit Error Rate (BER)');

title('BER vs SNR for QAM');

**OUTPUT**

