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**group 1, Section 2**

**Lab Code:**

% Step 1: Set the simulation parameters

num\_bits = 1e6;

SNR\_range = 0:2:30;

num\_iterations = 5;

BER = zeros(1, length(SNR\_range));

for snr\_idx = 1:length(SNR\_range)

% Step 2: Generate random binary data vector

data = randi([0 1], 1, num\_bits);

% Step 3: Apply noise to bits

SNR = 10^(SNR\_range(snr\_idx)/10);

P = 1; % average power of transmitted signal

noise\_power = P/SNR;

noise = sqrt(noise\_power) \* randn(1, num\_bits);

received\_signal = data + noise;

% Step 4: Decide whether the received signal is '1' or '0'

detected\_data = (received\_signal >= 0.5);

% Step 5: Calculate the number of errors

num\_errors = 0;

for i = 1:num\_iterations

errors = biterr(data, detected\_data);

num\_errors = num\_errors + errors;

detected\_data = (received\_signal >= 0.5);

end

% Calculate bit error rate (BER)

BER(snr\_idx) = num\_errors / ( num\_iterations \* num\_bits);

end

% Step 7: Plot the BER vs SNR curve

semilogy(SNR\_range, BER,'-o','LineWidth',2,'MarkerSize',8);

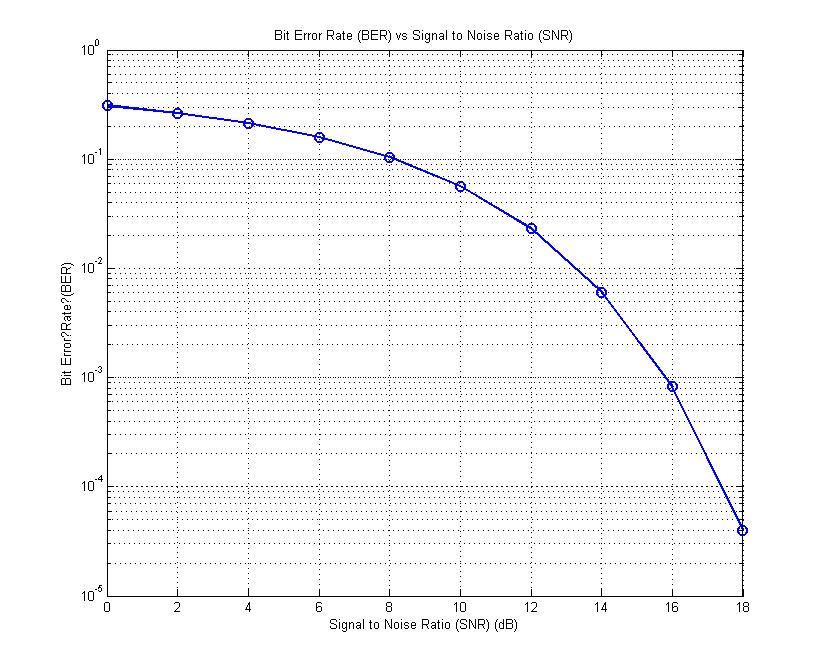
grid on;

title('Bit Error Rate (BER) vs Signal to Noise Ratio (SNR)');

xlabel('Signal to Noise Ratio (SNR) (dB)');

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

**Output of Code:**

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