

***NAMAL UNIVERSITY MIANWALI***

***DEPARTMENT OF ELECTRICAL ENGINEERING***

***Communication Systems (Lab)LAB # 06***

***REPORT***

***Title :***

***Quadrature Amplitude Modulation (QAM) using MATLAB/Simulink***

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| ***Roll No*** | ***NIM-BSEE-2021-24*** |
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| ***Date Performed*** | ***15-April-2024*** |
| ***Marks*** |  |

% Parameters

fm = 10; % Message signal frequency (Hz)

Am = 1; % Message signal amplitude

thetam = 0; % Message signal phase angle

fs = 10000; % Sampling frequency (Hz)

fc = 500; % Carrier frequency (Hz)

Ac = 1; % Carrier signal amplitude

thetac = 0; % Carrier signal phase angle

fredev = 250; % Frequency deviation factor

% Time vector

t = 0:1/fs:0.1; % Time scale for one time period of the message signal

% Message signal

message = Am \* cos(2\*pi\*fm\*t + thetam);

% Modulation using built-in function

modulated = fmmod(message, fc, fs, fredev);

% Demodulation using built-in function

demodulated = fmdemod(modulated, fc, fs, fredev);

% Plotting

figure;

% Input signal

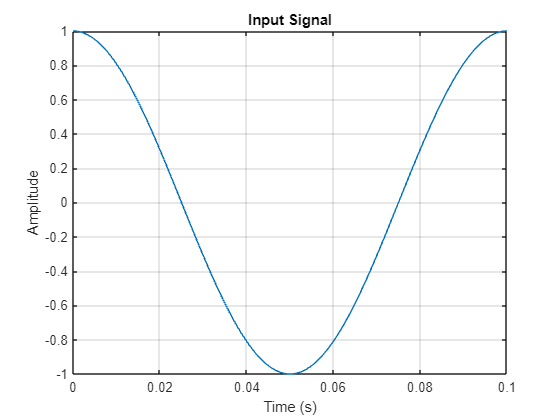
plot(t, message);

xlabel('Time (s)');

ylabel('Amplitude');

title('Input Signal');

grid on;



% Modulated signal

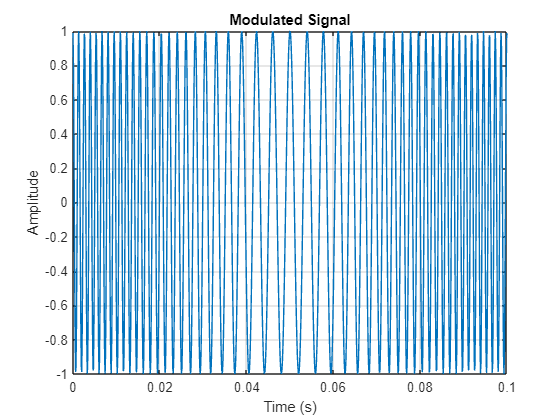
plot(t, modulated);

xlabel('Time (s)');

ylabel('Amplitude');

title('Modulated Signal');

grid on;



% Magnitude spectrum of input signal

fft\_message = abs(fft(message));

frequencies = linspace(0, fs, length(fft\_message));

plot(frequencies(1:length(frequencies)/2), fft\_message(1:length(frequencies)/2));

Warning: Integer operands are required for colon operator when used as index.

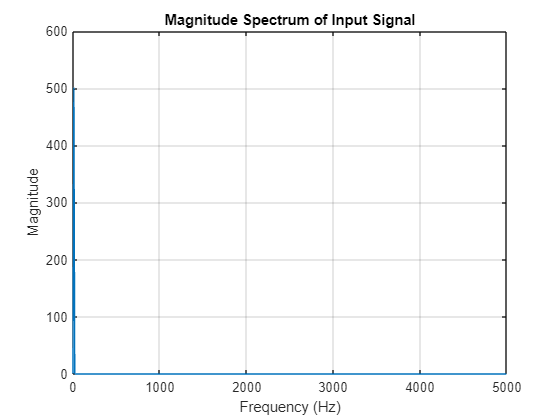
Warning: Integer operands are required for colon operator when used as index.

xlabel('Frequency (Hz)');

ylabel('Magnitude');

title('Magnitude Spectrum of Input Signal');

grid on;



% Demodulated signal

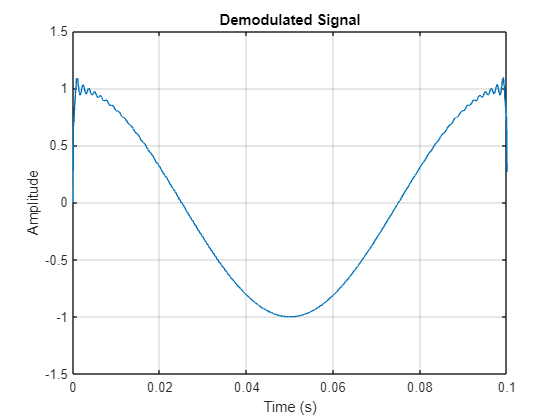
plot(t, demodulated);

xlabel('Time (s)');

ylabel('Amplitude');

title('Demodulated Signal');

grid on;



% Magnitude spectrum of demodulated signal

fft\_demodulated = abs(fft(demodulated));

plot(frequencies(1:length(frequencies)/2), fft\_demodulated(1:length(frequencies)/2));

Warning: Integer operands are required for colon operator when used as index.

Warning: Integer operands are required for colon operator when used as index.

xlabel('Frequency (Hz)');

ylabel('Magnitude');

title('Magnitude Spectrum of Demodulated Signal');

