% Carlos Lazo

% ECE 503

% Homework #7

% Due: 3/14/10

%% 1) Signal Sampling and Reconstruction

clear all; close all; clc;

% b. P&M 1.15

% Part (a)

% Define all equations and frequencies:

Fs = 5e3;

Fo\_1 = .5e3;

Fo\_2 = 2e3;

Fo\_3 = 4e3;

Fo\_4 = 4.5e3;

n = 0:99;

xn\_1 = sin(2\*pi\*(Fo\_1/Fs)\*n);

xn\_2 = sin(2\*pi\*(Fo\_2/Fs)\*n);

xn\_3 = sin(2\*pi\*(Fo\_3/Fs)\*n);

xn\_4 = sin(2\*pi\*(Fo\_4/Fs)\*n);

figure;

plot(n,xn\_1);

xlabel('Samples');

ylabel('Amplitude');

title('x(n), Fs = 5kHz, Fo = 0.5kHz');

figure;

plot(n,xn\_2);

xlabel('Samples');

ylabel('Amplitude');

title('x(n), Fs = 5kHz, Fo = 2kHz');

figure;

plot(n,xn\_3);

xlabel('Samples');

ylabel('Amplitude');

title('x(n), Fs = 5kHz, Fo = 3kHz');

figure;

plot(n,xn\_4);

xlabel('Samples');

ylabel('Amplitude');

title('x(n), Fs = 5kHz, Fo = 4.5kHz');

% Part (b)

Fs = 50e3;

Fo = 2e3;

x\_n = sin(2\*pi\*(Fo/Fs)\*n);

figure;

plot(n,x\_n);

xlabel('Samples');

ylabel('Amplitude');

title('x(n), Fs = 50kHz, Fo = 2kHz');

n\_y = 0:2:99;

y\_n = sin(2\*pi\*(Fo/Fs)\*n\_y);

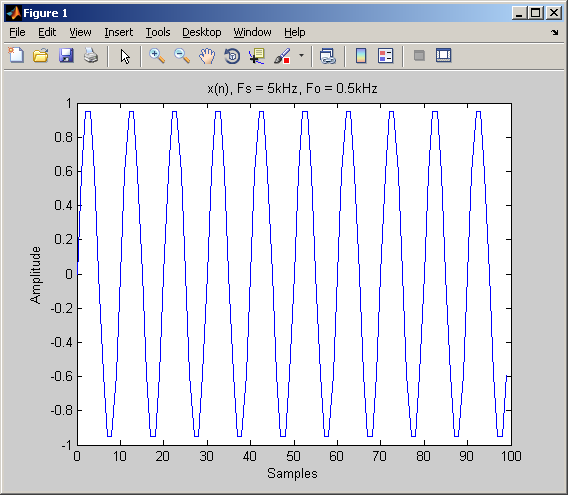
figure;

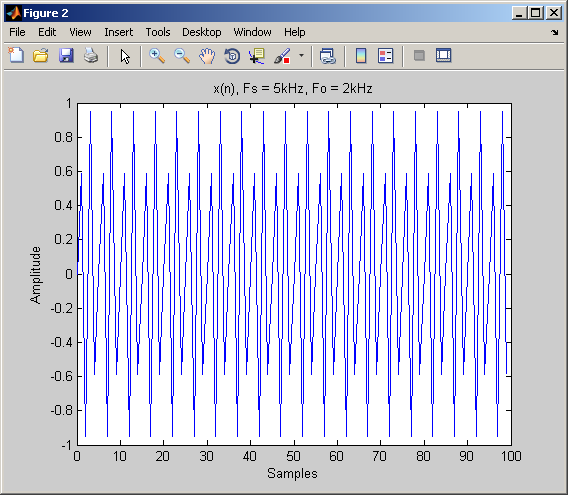
plot(n\_y,y\_n);

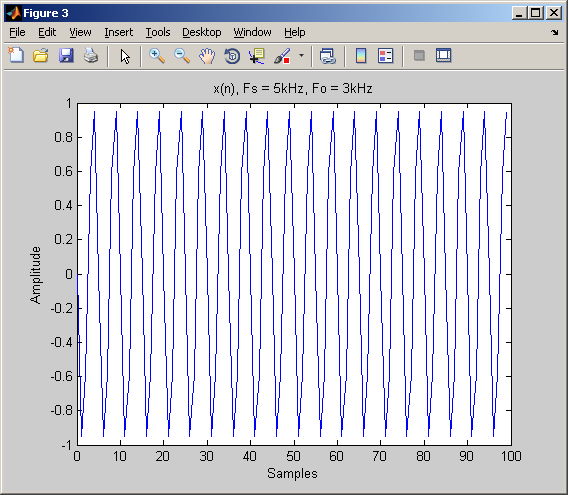
xlabel('Samples');

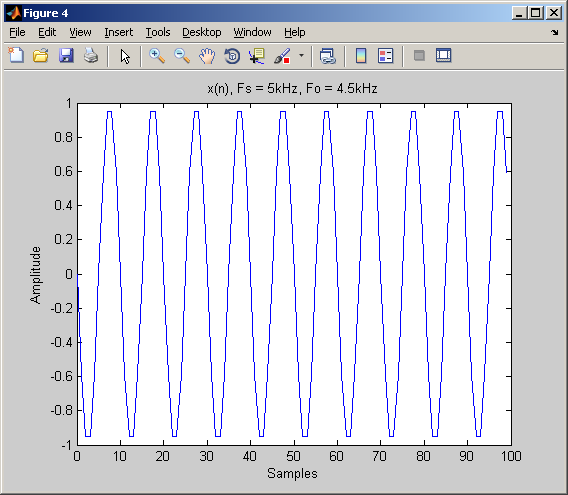
ylabel('Amplitude');

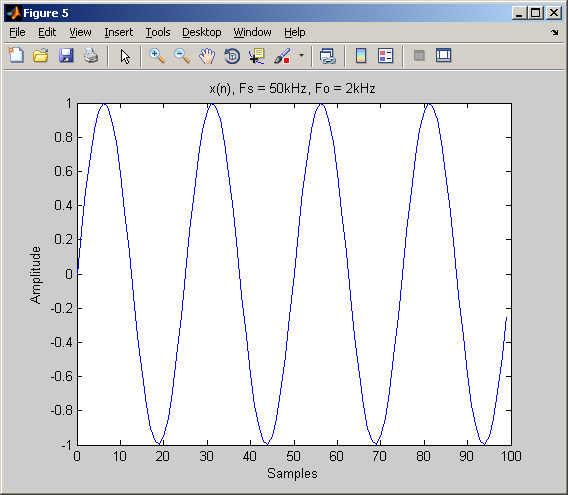
title('y(n), Fs = 50kHz, Fo = 2kHz');

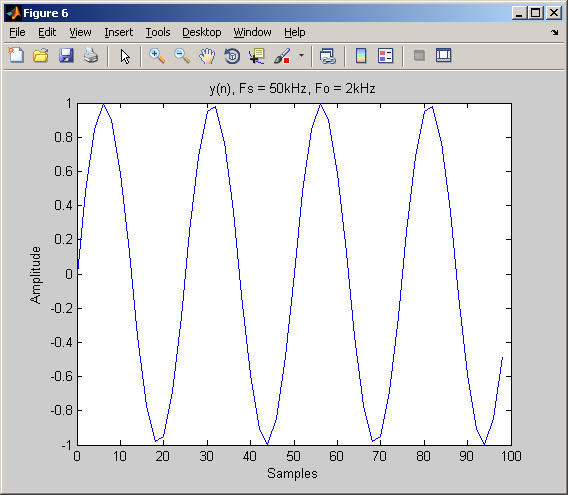












%% 2) Filter Concepts

clear all; close all; clc;

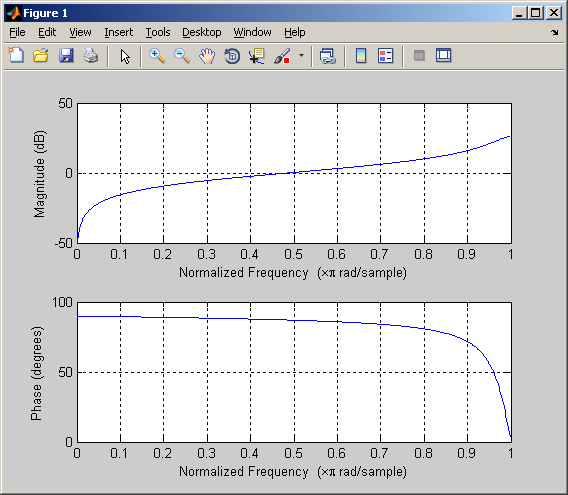
% b. P&M 5.27

% Part (b)

b = [1 -1];

a = [1 .9];

freqz(b,a);



%% 2) Filter Concepts

clear all; close all; clc;

% c. P&M 5.34

w = 0:2\*pi/1000:2\*pi;

H\_w = 1 + exp(-1\*j\*w) + exp(-2\*j\*w) + exp(-3\*j\*w) + exp(-4\*j\*w) + exp(-5\*j\*w) + exp(-6\*j\*w) + exp(-7\*j\*w) + exp(-8\*j\*w);

figure;

subplot(2,1,1);

plot(w, abs(H\_w));

xlabel('w = 0:2\*pi/1000:2\*pi');

ylabel('Magnitutde');

title('|H(e^jw)|');

subplot(2,1,2);

plot(angle(H\_w));

xlabel('w = 0:2\*pi/1000:2\*pi');

ylabel('Magnitutde');

title('Phase[H(e^jw)]');

