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h1 = [0.037829, -0.023849, -0.110624, 0.37740, 0.852699] % h'[n] coefficients
h2 = [-0.064539, -0.04069, 0.418092, 0.788485] % h~'[n] coefficients
[H1, w1] = freqz(h1, 1, 1024); % using freqz for h'[n]
[H2, w2] = freqz(h2, 1, 1024); % using freqz for h~'[n]
figure; % plots of magnitude and phase of h'[n]
plot(w1/pi, 20*log10(abs(H1)));
title('Magnitdue 1');
xlabel('frequency');
ylabel('Magnitude in dB');
figure;
plot(w1/pi, angle(H1));
title('Phase 1');
xlabel('frequency');
ylabel('Phase in radians');
figure; % plots of magnitude and phase of h~'[n]
plot(w2/pi, 20*log10(abs(H2)));
title('Magnitude 2');
xlabel('frequency');
ylabel('Magnitude in dB');
figure;
plot(w2/pi, angle(H2));
title('Phase 2');
xlabel('frequency');
ylabel('Phase in radians');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (b) %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
h = circshift(h1, 4); % shift by 4
htilde = circshift(h2, 3); % shift by 3
% plot this using stem function
figure;
stem(h, 'filled');
title('h[n] shifted');
xlabel('n');
ylabel('h[n]');
figure;
stem(htilde, 'filled');
title('h~[n] shifted');
xlabel('n');
ylabel('h~[n]');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (c) %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% plot the magnitude now
figure;
subplot(2,1,1);
plot(w2/pi, abs(H1));
title('H(e^{jw})');
xlabel('frequency');
ylabel('magnitude');
subplot(2,1,2);
plot(w2/pi, abs(H2));
title('H~(e^{jw})');

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xlabel('frequency');
ylabel('magnitude');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (c) %%%%%%%%%
% find the sum
H_sum = abs(H1).^2 + abs(H2).^2;
figure;
plot(wl/pi, H_sum); % should equal 2
title('Sum');
xlabel('frequency');
ylabel('magnitude');

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