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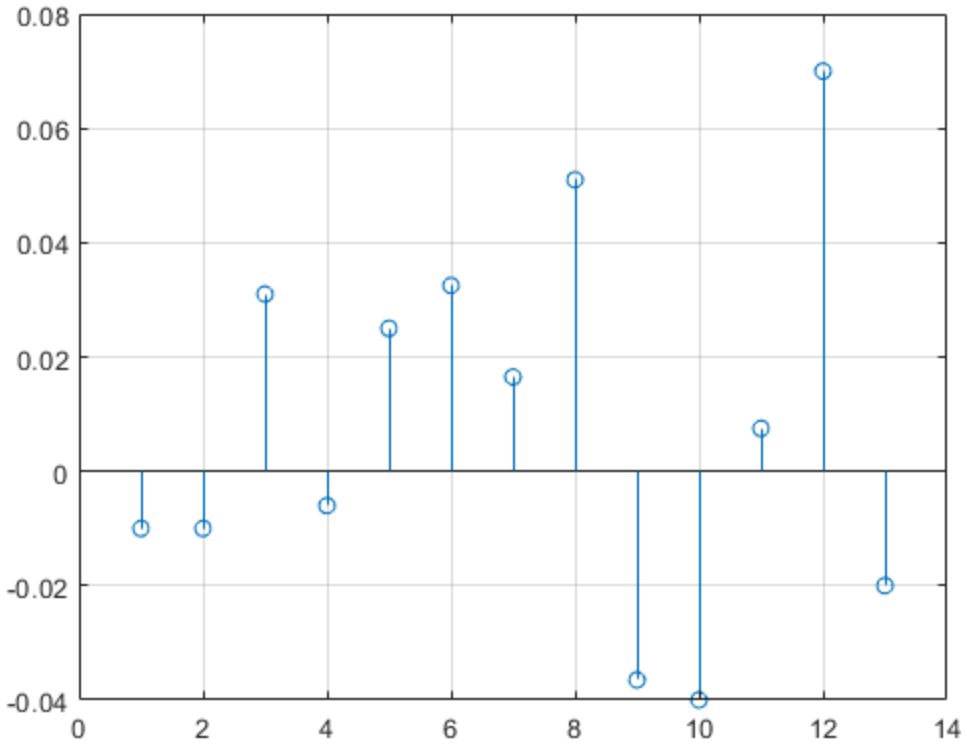
Dan Otieno. CPE 381 Final. 04/26/23.

========== Q12 ==========

This was completed manually but plotted in MATLAB to double-check myself.

```
xn = [0.1 0.3 0.24 0.39 0.41 0.3 0.23 -0.2 -0.15 0.2 0.4]
hn = [-0.1 0.2 -0.05]
y = conv(xn, hn)
stem(y)
grid on
```

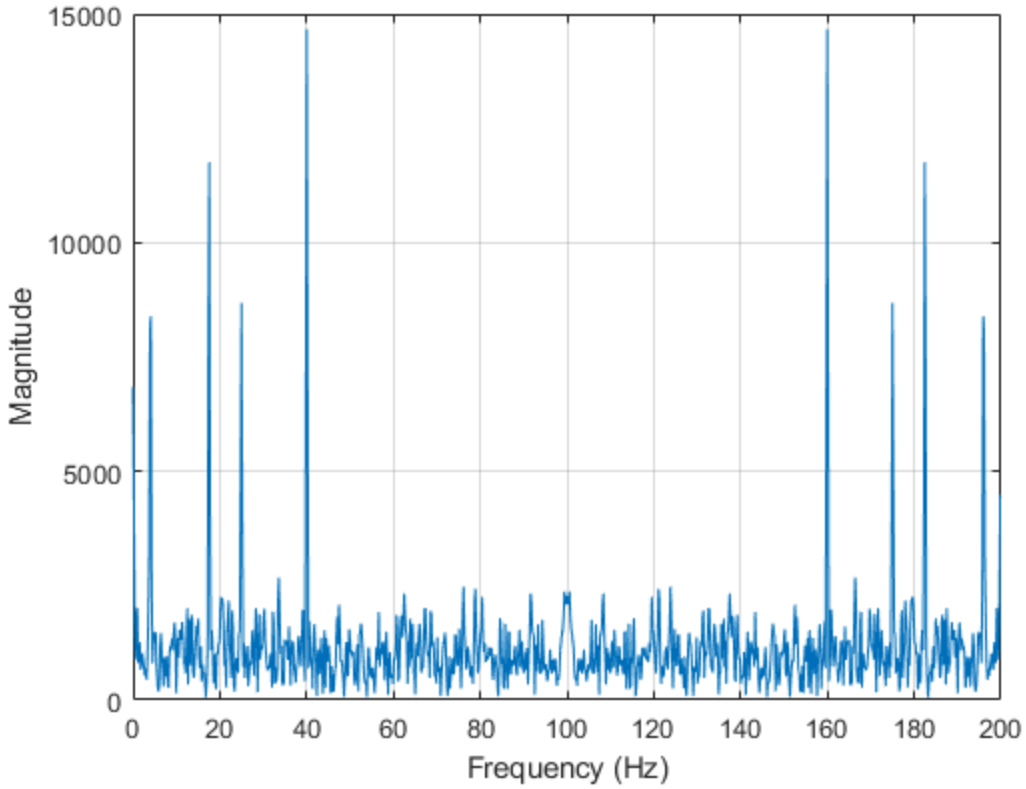
```
xn =

  Columns 1 through 7

    0.1000    0.3000    0.2400    0.3900    0.4100    0.3000    0.2300

  Columns 8 through 11

   -0.2000   -0.1500    0.2000    0.4000


hn =

   -0.1000    0.2000   -0.0500


y =

  Columns 1 through 7

   -0.0100   -0.0100    0.0310   -0.0060    0.0250    0.0325    0.0165

  Columns 8 through 13

    0.0510   -0.0365   -0.0400    0.0075    0.0700   -0.0200
```



========== Q18 ==========

```
load('final_exam.mat');
Fs= 200;
NFFT = 1024;
dF = Fs/ NFFT;
t = (0:NFFT-1)*dF;
M_win = hanning(1024);
x = x .* transpose(M_win);
FFT_x = fft(x,1024);
FFT_x = abs(FFT_x);
plot(t,FFT_x);
xlabel('Frequency (Hz)');
ylabel('Magnitude');
grid on
%----------------------------------------------------------------
```

==========



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