

Code

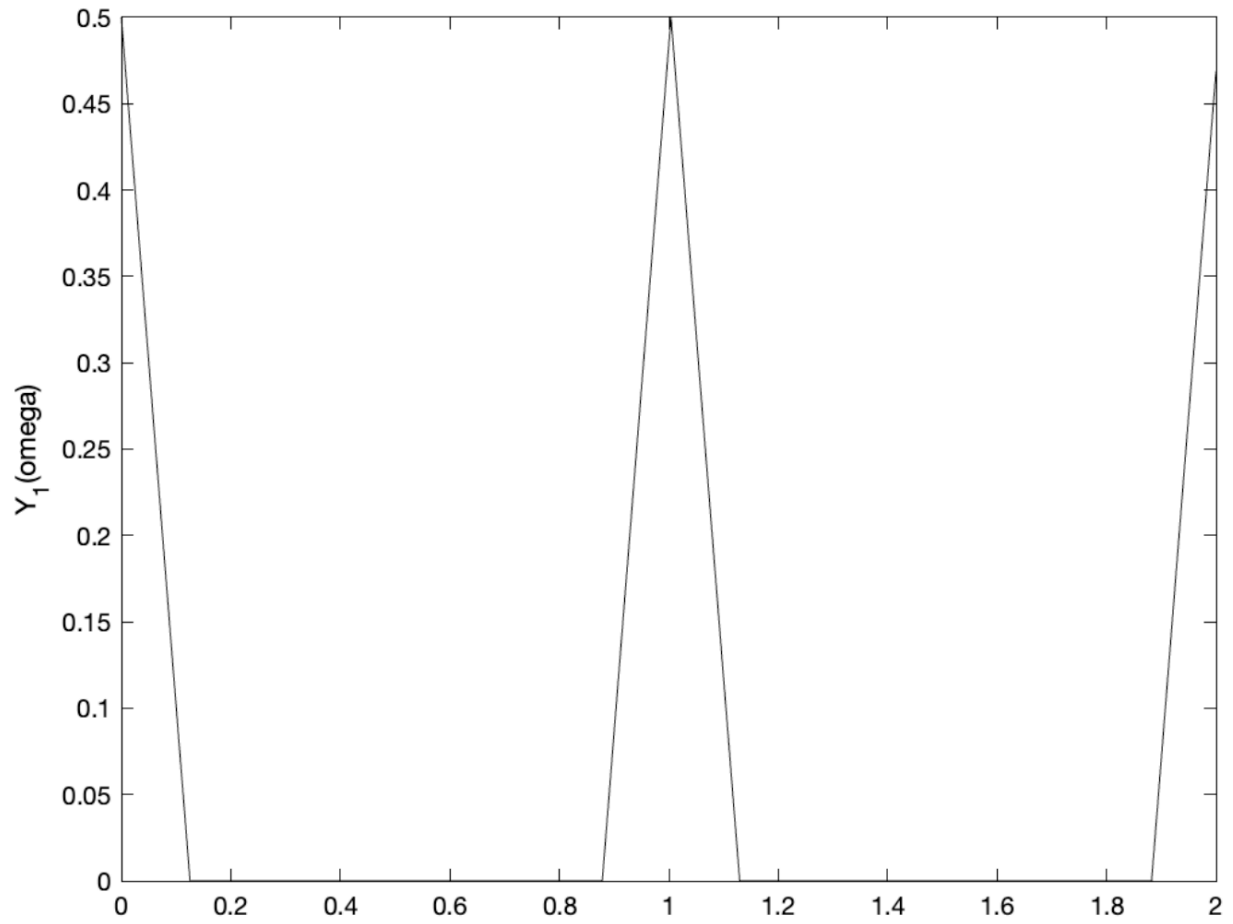
L3.1:

```
for i = 1:16
    X(i) = 1 - (i-1)/16;
end
for i = 17:240
    X(i) = 0;
end
for i = 241:256
    X(i) = (i-241)/16;
end
x = ifft(X, 256);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (a) %%%%%%%%%%
% make every other sample a zero
y1 = zeros(size(x));
y1(1:2:end) = x(1:2:end); %keeping every other sample
Y1 = fft(y1, 256); % take fourier transform
w = linspace(0, 2*pi, 256);
%plot
figure;
title('Sampler Sequence');
plot(w/pi, abs(Y1));
xlabel('frequency in pi');
ylabel('Y_1(w)');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (b) %%%%%%%%%%
% take every other sample
y2 = x(1:2:256);
% take fourier transform
Y2 = fft(y2, length(y2));
figure;
plot(w/pi, abs(Y2));
xlabel('frequency in pi');
ylabel('Y_2(w)');
title('Compressor Sequence');
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Part (c) %%%%%%%%%%
% zero padding
y3 = zeros(1, 2*length(x));
y3(1:2:end) = x;
Y3 = fft(y3, length(y3)); %fourier transform
figure;
plot(w/pi, abs(Y3));
xlabel('frequency in pi');
```

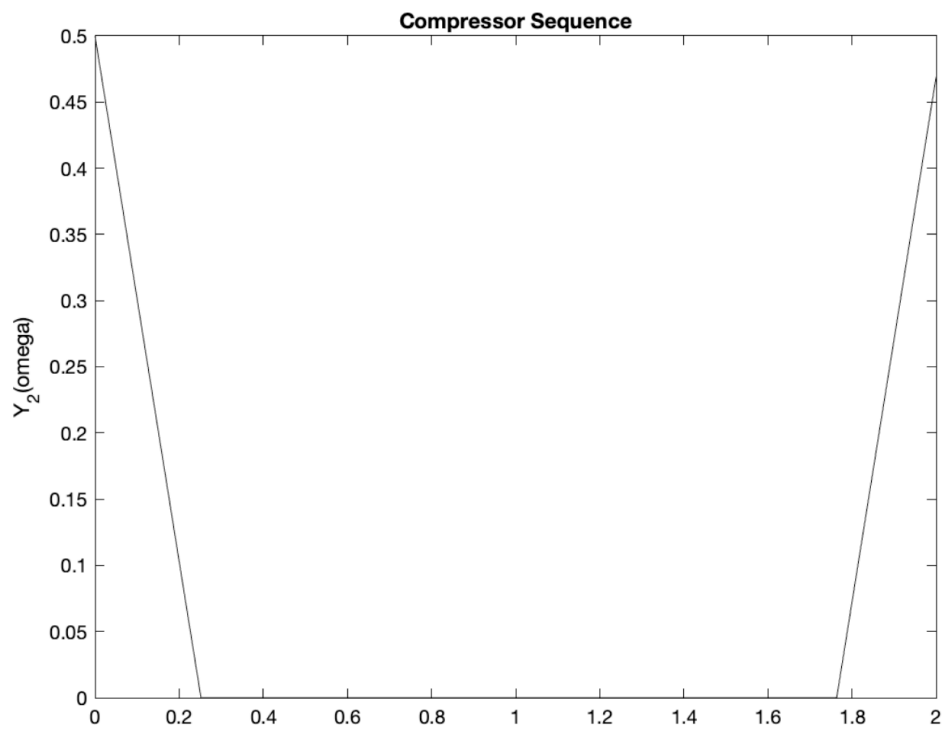
```
ylabel('Y_3(w)');  
title('Expander Sequence');
```

Plots

(a)



(b)



(c)

