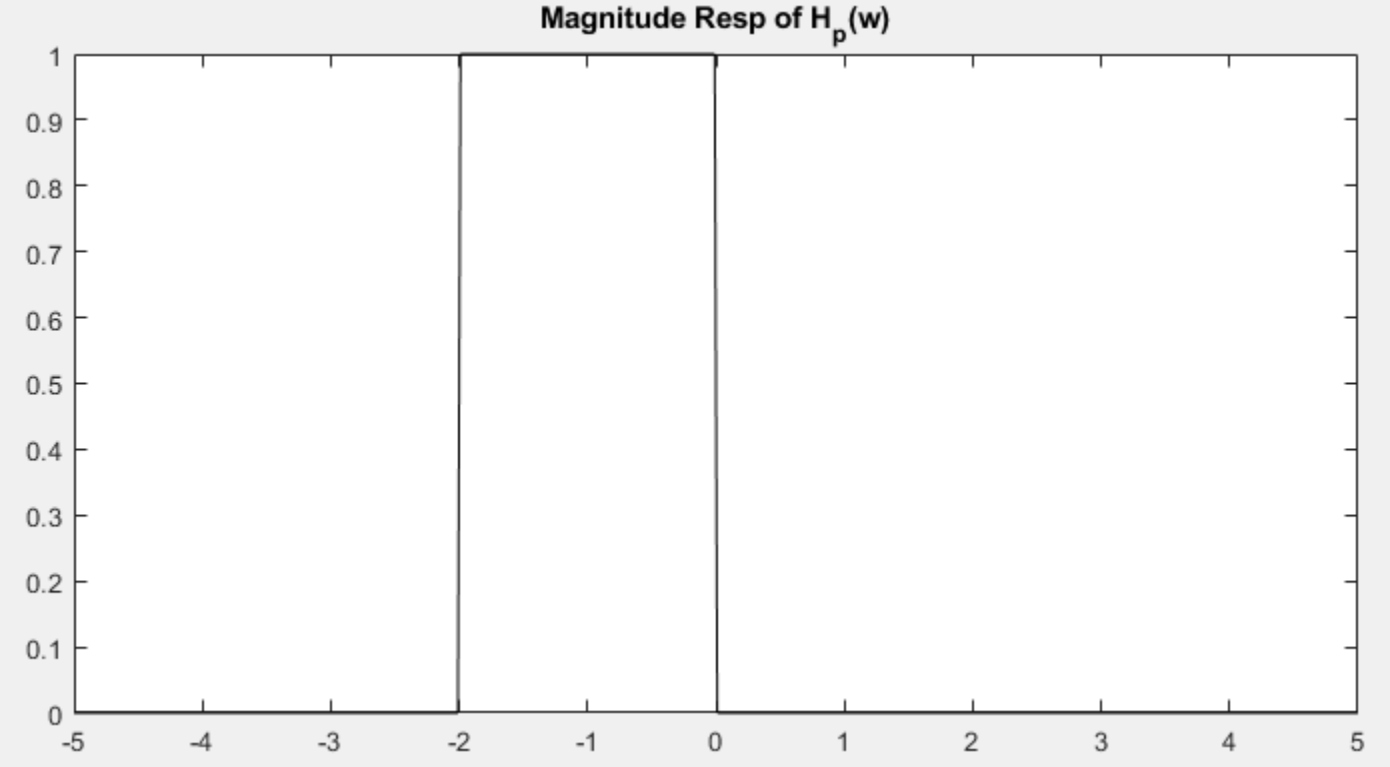
Thomas Smallarz ECE444 Homework 2

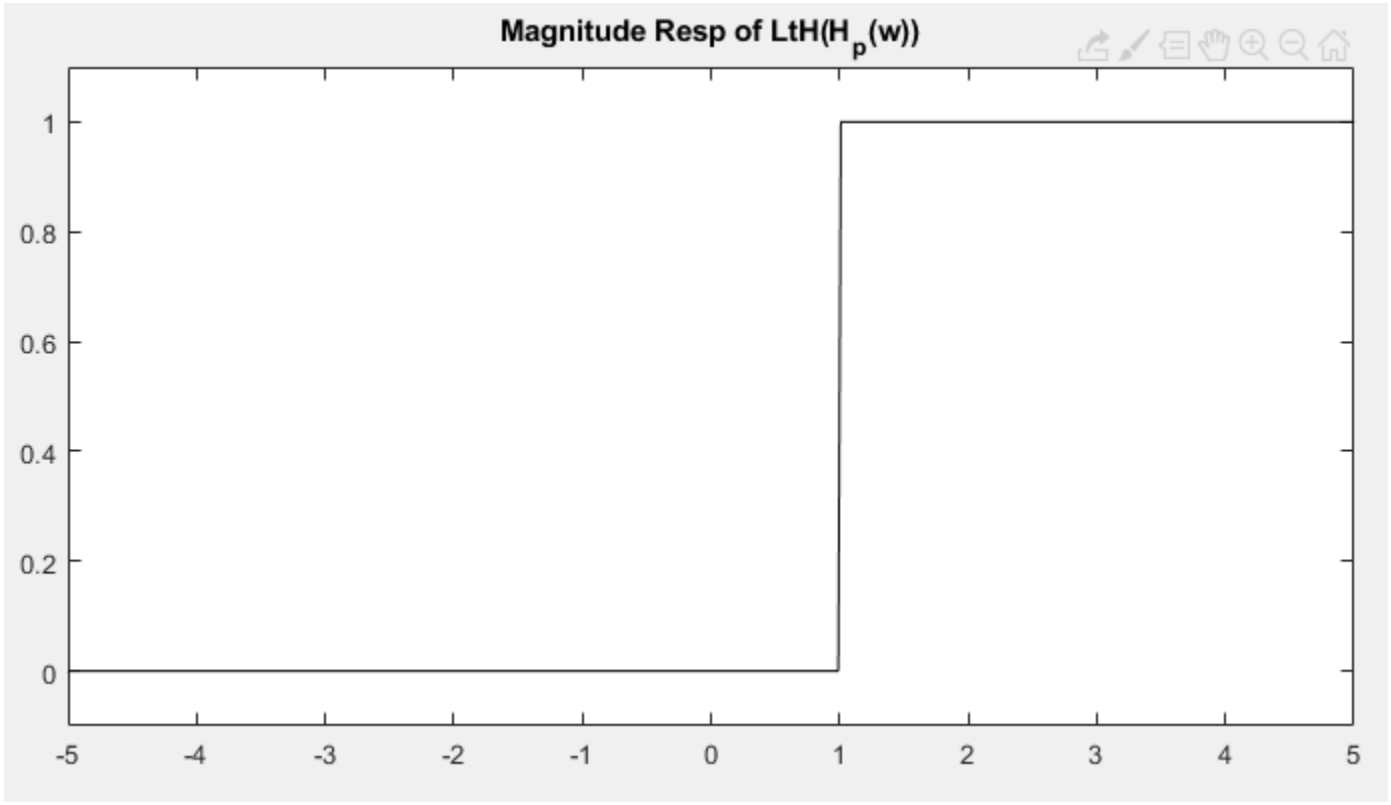
2.6-4)

a) Using MATLAB,



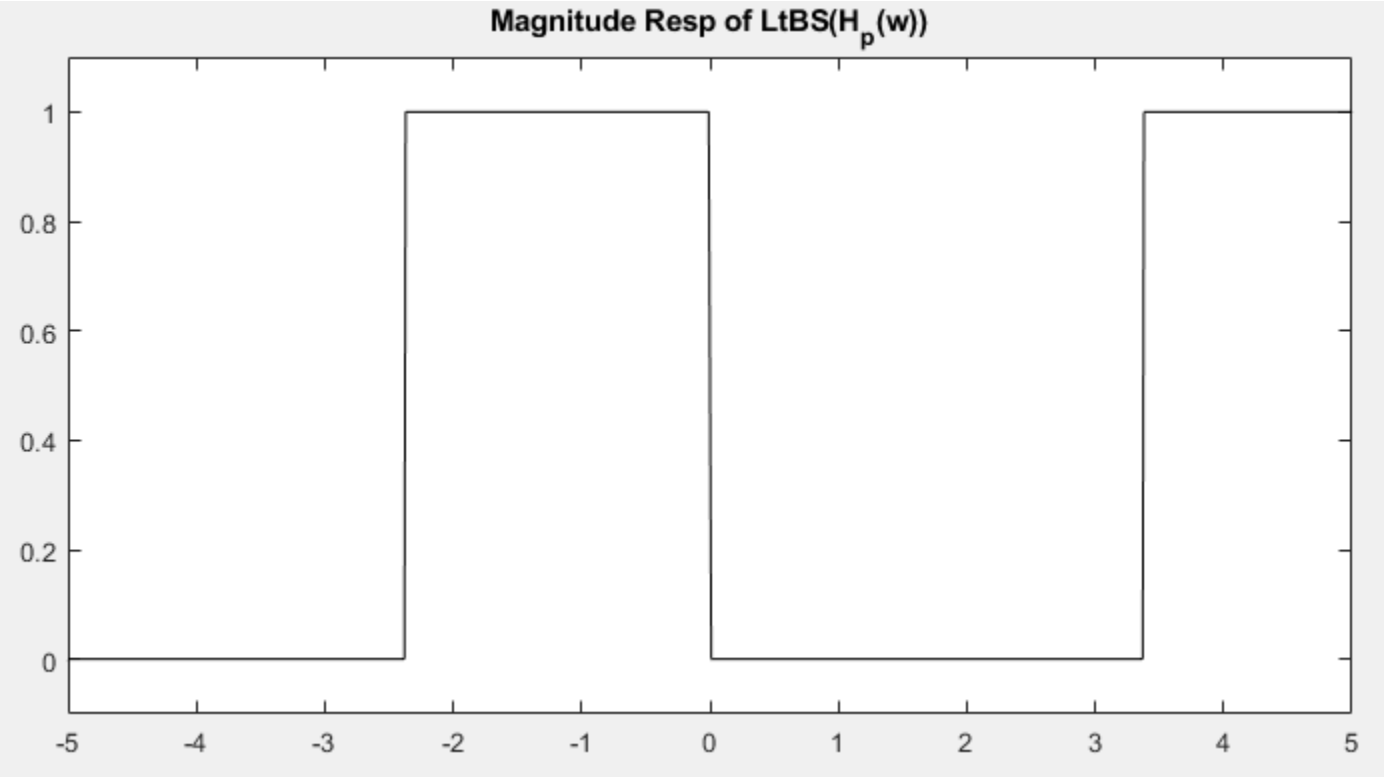
c) Lowpass-to-highpass with $\omega_0 = 1 \; and \; w_1 = 2$

$$\omega \rightarrow \frac{\omega_0 \omega_1}{-\omega} = \frac{2}{-\omega}$$



e) lowpass-to-bandstop with $\omega_0 = 1\ and\ w_1 = 2\ and\ w_2 = 4$

$$\omega \to \omega_0 \left(\frac{\omega(\omega_2 - \omega_1)}{-\omega^2 + \omega_1 \omega_2} \right) = \frac{2\omega}{-\omega^2 + 8}$$



Editor - C:\Users\thomas.smallarz\Documents\MATLAB\HW2\C2_6_4.m

C2_6_4.m

```
1 -    gate = @(w) (abs(w) < 0.5) + (0.5).*(abs(w) == 0.5);
2
3 -    H_p = @(w) gate((w+1)./2);
4 -    w = -6:0.01:6;
5 -    w_c = 2./-w;
6 -    w_e = (w.*2)./(-w.^2+8);
7
8 -    subplot(221); plot(w,abs(H_p(w)),'k'); title("Magnitude Resp of H_p(w)");
9 -    subplot(222); plot(w,abs(H_p(w_c)),'k'); title("Magnitude Resp of LtH(H_p(w))"); axis([-5 5 -0.1 1.1]
10 -   subplot(223); plot(w,abs(H_p(w_e)),'k'); title("Magnitude Resp of LtBS(H_p(w))"); axis([-5 5 -0.1 1.1
11
```