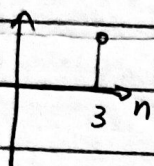


EC574 HW7

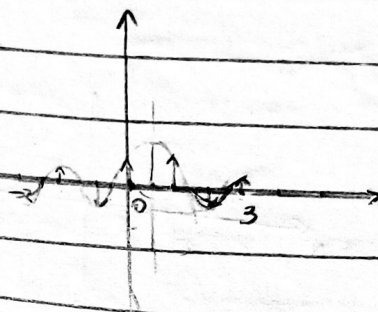
7.1

a)



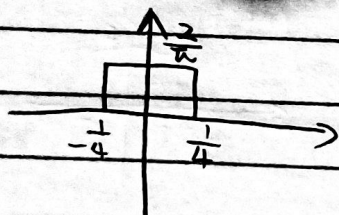
envelope is a straight line

b)



7.2

a) we know $h[n] = \frac{\pi}{2} \text{sinc}(\frac{\pi}{2}n)$



b) ① $h[n] = h[n-3]w[n]$ $w[n] = u[n] - u[n-7]$

$$F\{x[n-n_0]\} = X(e^{j\omega}) e^{-jn_0\omega}$$

$$\text{So } F\{h[n-3]\} = H(e^{j\omega}) e^{-j3\omega}$$

$w[n] = u[n] - u[n-7]$ which is a window effect. we could find from equation

$$W(e^{j\omega}) = \sum_{n=0}^6 e^{-jn\omega} = \frac{1 - e^{-j7\omega}}{1 - e^{-j\omega}}$$

$$H(e^{j\omega}) = H(e^{j\omega}) W(e^{j\omega}) e^{-j3\omega}$$

$$R(e^{j\omega}) = H(e^{j\omega}) W(e^{j\omega})$$

by definition we know

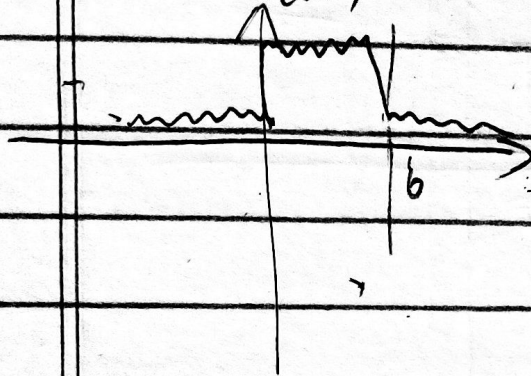
we could find that plug back

$$H(e^{j\omega}) = R(e^{j\omega}) e^{-j3\omega}$$

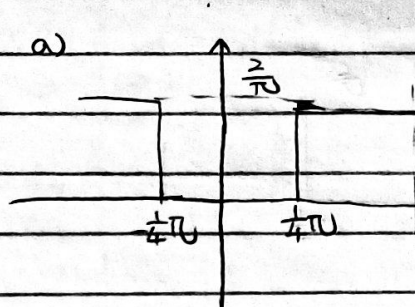
$R(e^{j\omega})$ is real as H and W are real.

this is convolution of H and W .

② $R(\omega)$ will be convolution of a rect and sinc function.



7.3



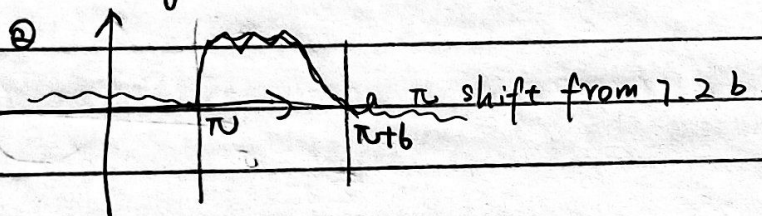
$$F\{(-1)^n\} = e^{j\pi\omega}$$

$$y(n) = x(n) (-1)^n \quad Y(\omega) = X(\omega - \pi)$$

so it is just same as 7.2 except a

ω π shift.
 $\frac{3}{4}\pi > \pi$
 so not include

b) ① the Proving will be the same as this is not related to what h_{id} is.



7.4

a) since h_{id} is the same as previous, so is the plot of H_{id} .

b) ① the Proving will be the same as it is not related to what w_{cm} is

② will be same as 7.2

convoluting with $\text{rect} * \text{rect}$ which is a triangle function. which results in another triangle function.

