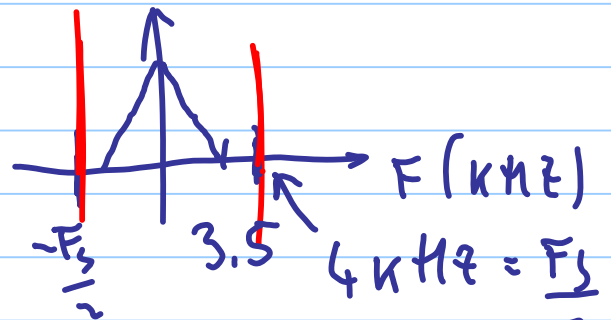
Project 5 :

Note Title 5/19/2011



$F_s = 8\,kHz$

CARRIER FREQ.

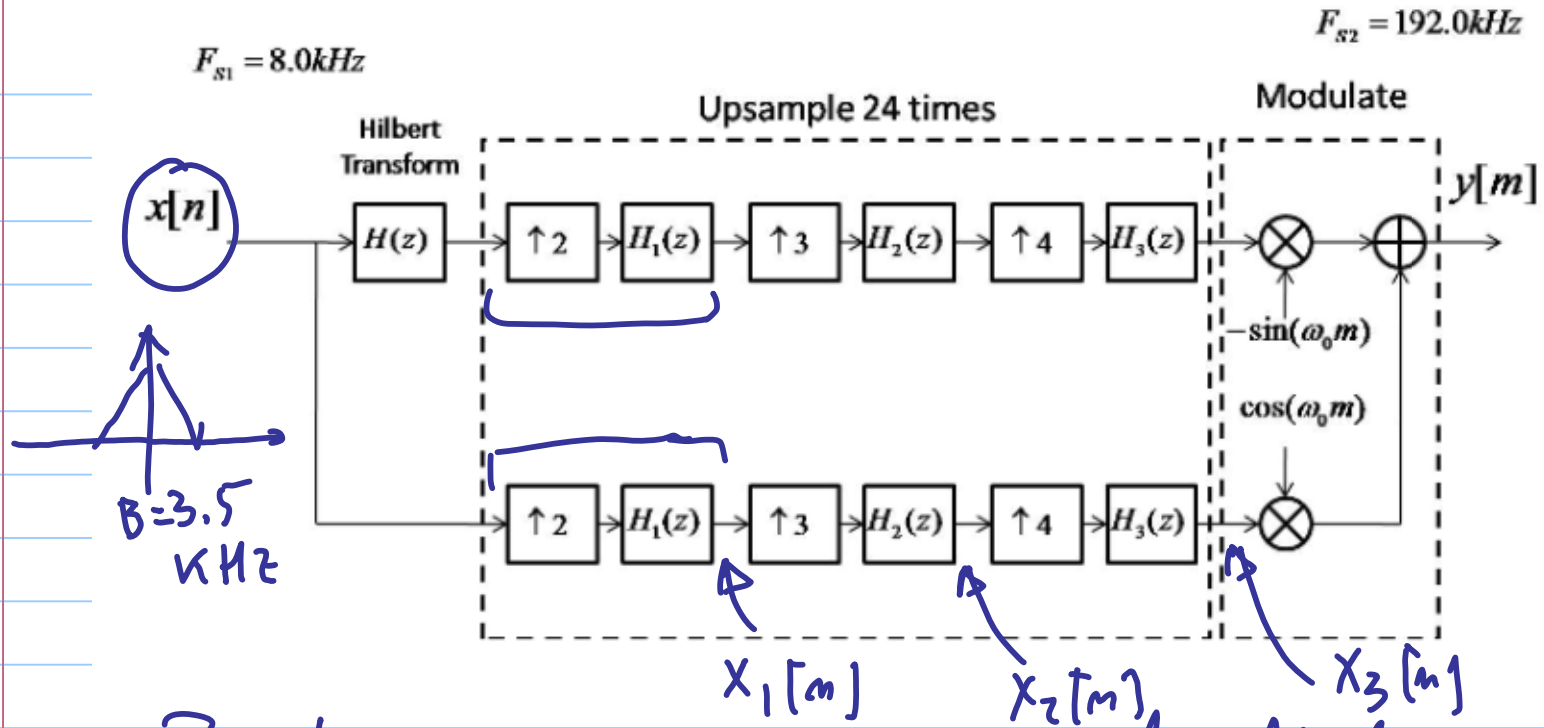
$F_0 = 80\,kHz$

$F_0 >> \frac{F_s}{2}$

Solution: upsample to at least

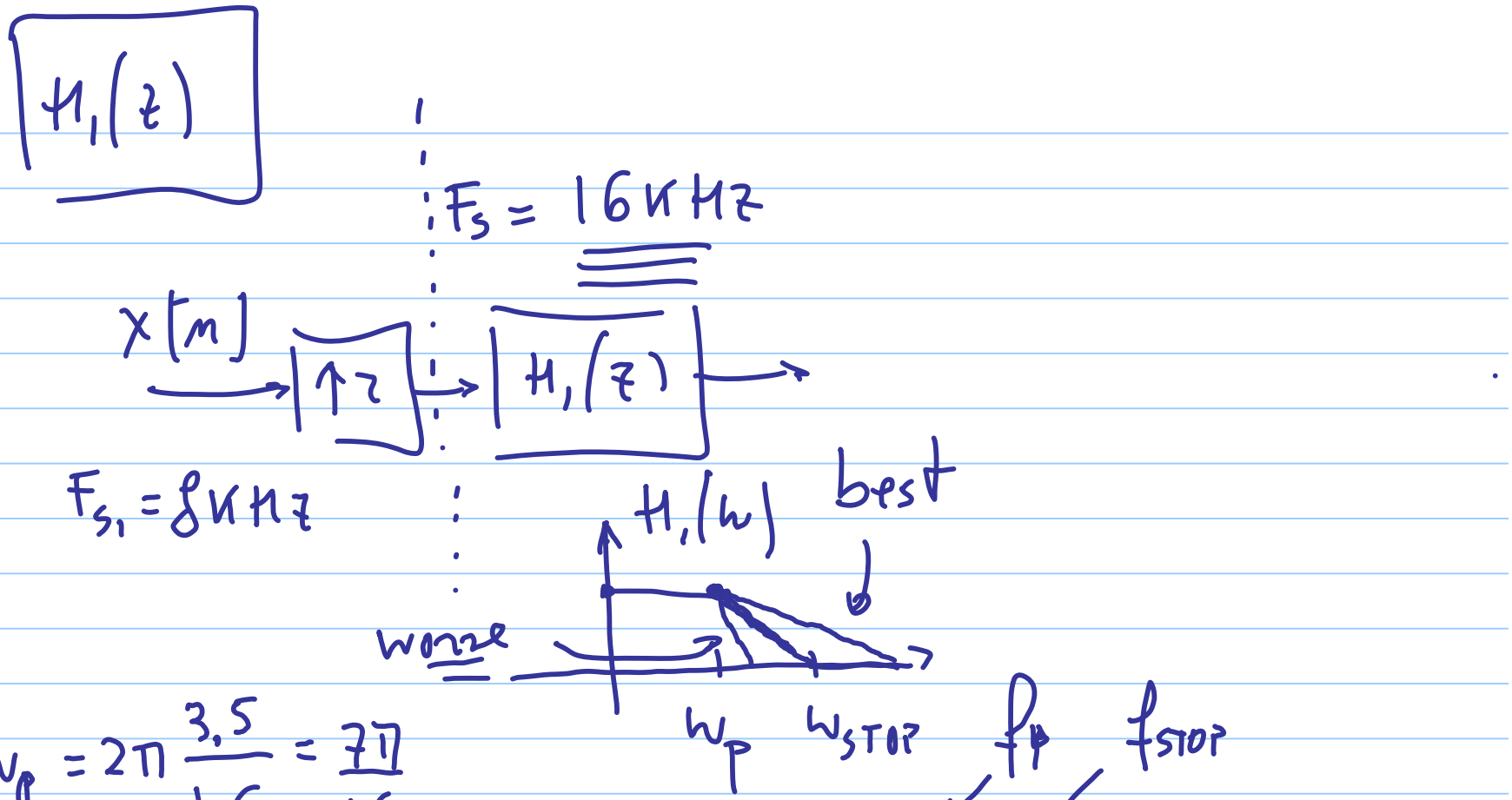
$F_{s_2} \geq 2 * (80 + 3.5)$

choose $F_{s_2} = 24 F_{s_1} = 24 \times 8 = 192\,kHz$



Passband: $F_{PASS} = 3.5$ kHz for all filters

Stopband: has to be determined.



$$\omega_p = 2\pi \frac{3,5}{16} = \frac{7\pi}{16}$$

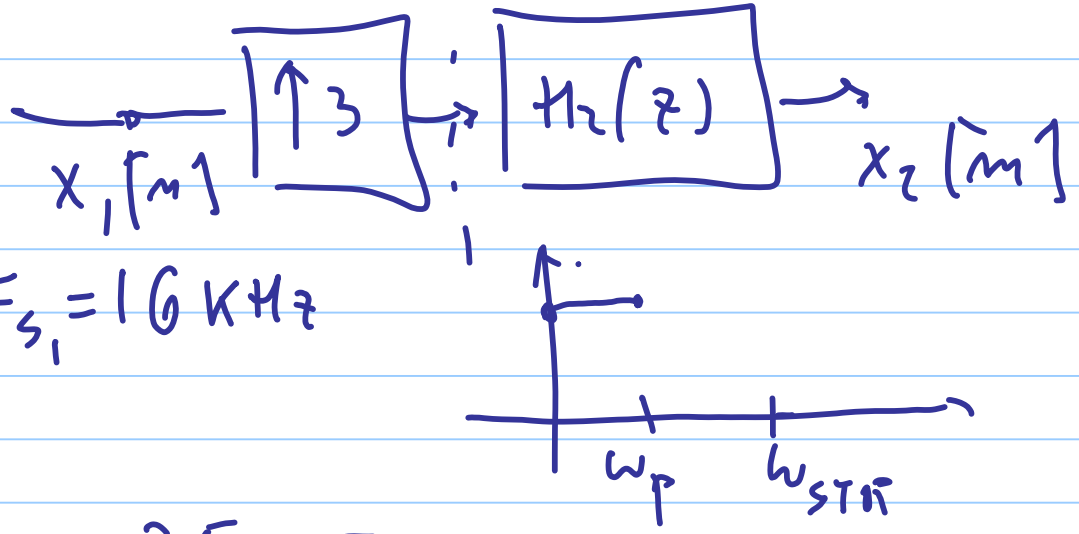
$$\omega_{STOP} = \frac{\pi}{2} \Rightarrow h_1 = firpm\left(N, \left[0, \frac{7}{16}, \frac{1}{2}, 1\right], A\right)$$

f_p f_{STOP}

$A = [1,1,0,0]$

$H_2(z)$

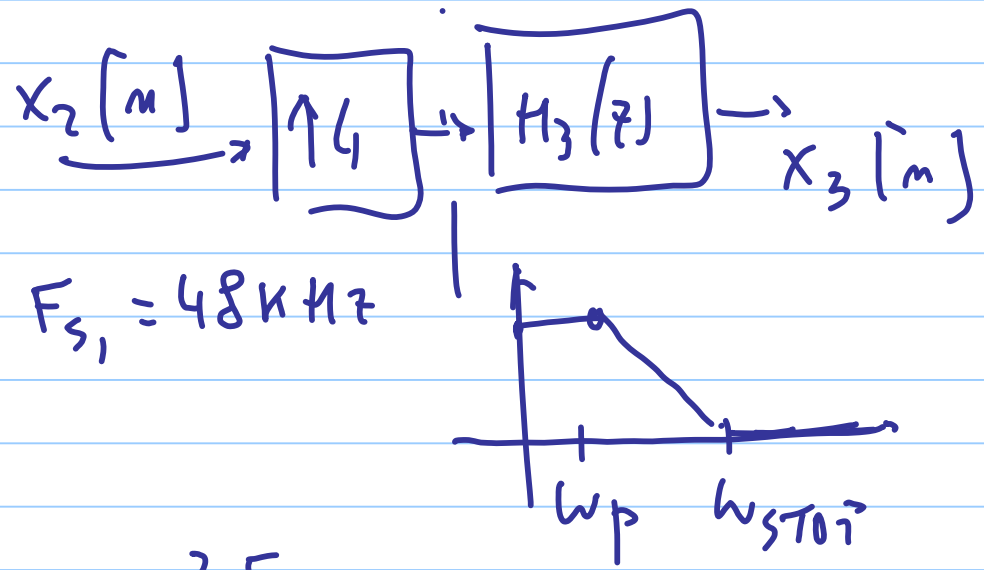
$F_{S_2} = 48\ KHz$



$$\omega_p = 2\pi \frac{3.5}{48} = \frac{7\pi}{48}\ rad.$$

$$\omega_{STOP} = \frac{\pi}{3} \Rightarrow h_2 = firpm\left(N_2, \left[0, \frac{7}{48}, \frac{1}{3}, 1\right], A\right);$$

$H_3(z)$ $\quad F_{s_2} = 192\,kHz$



$$\omega_p = 2\pi \frac{3.5}{192} = \frac{7\pi}{192}\ rad.$$

$$\omega_{stop} = \frac{\pi}{4} \Rightarrow h_3 = firpm\left(N_3, \left[0, \frac{7}{192}, \frac{1}{4}, 1\right], A\right)$$

Modulate:

$$\omega_0 = 2\pi \frac{F_0}{F_s} = 2\pi \frac{80}{192} = \dots$$

CARRIER Digital Freq.