# ECS 332: Quiz 2   Sol
(5 minutes)

Instructions

1. Separate into groups of no more than three persons.
2. Only one submission is needed for each group. Late submission will not be accepted.
3. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
4. **Do not panic.**

Name	ID
Prapun	

1. Consider $m(t) \xrightarrow{\ \mathcal{F}\ } M(f)$ whose spectrum is shown below
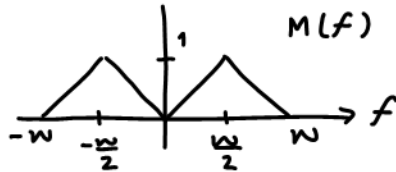
The m(t) above is transmitted via DSB-SC modulator below

$$2 + 3\cos(2\pi f_c t) + 4\cos(4\pi f_c t)$$
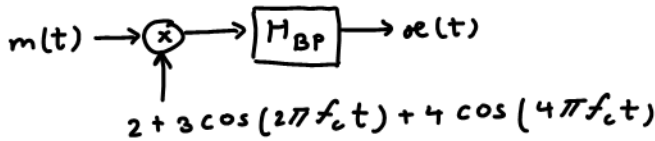
Also assume that $f_c \gg W$ and that

This is exactly the same as the BPF used in Hw2 Q7. So if you have done that question, you should not have to think too much about what this equation means.

$$H_{BP}(f) = \begin{cases} 1, & |f - f_c| \le W \\ 1, & |f + f_c| \le W \\ 0, & \text{otherwise.} \end{cases}$$

This BPF is centered around $\pm f_c$.

Plot $|X(f)|$.

After the multiplication, we have

$$2m(t) + 3m(t)\cos(2\pi f_c t) + 4m(t)\cos(4\pi f_c t).$$

$2m(t) \rightarrow 0$
killed by the BPF because its freq. content is centered around 0.

$3m(t)\cos(2\pi f_c t) \rightarrow$ this will pass through the BPF because its freq. content is centered around f_c (same as the passband of the BPF)

$4m(t)\cos(4\pi f_c t) \rightarrow$ killed by the BPF because its freq. content is centered around $2f_c$

$$x(t) = 3m(t)\cos(2\pi f_c t) \xrightarrow{\ \mathcal{F}\ }$$