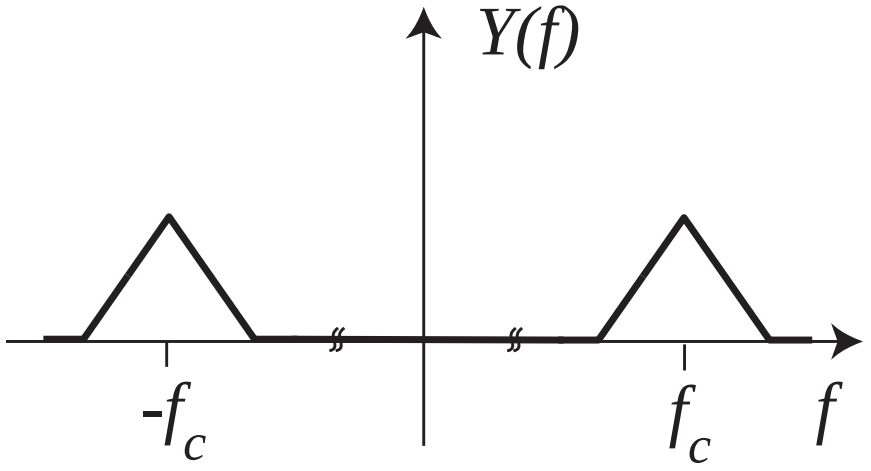
Coherent Demodulation

Consider the signal

$$y(t) = \cos(2\pi f_c t)u(t)$$

where $w(t) = \cos(2\pi f_c t)$ is the carrier signal, and $u(t)$ is the modulating signal. The modulated signal, $y(t)$, has spectrum (Fourier transform) as shown below:



The signal is to be demodulated by multiplying by $\cos(2\pi f_c t)$, so that $z(t) = \cos(2\pi f_c t)y(t)$. Sketch the spectrum of $z(t)$ on a 3×5 card.

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Consider the signal

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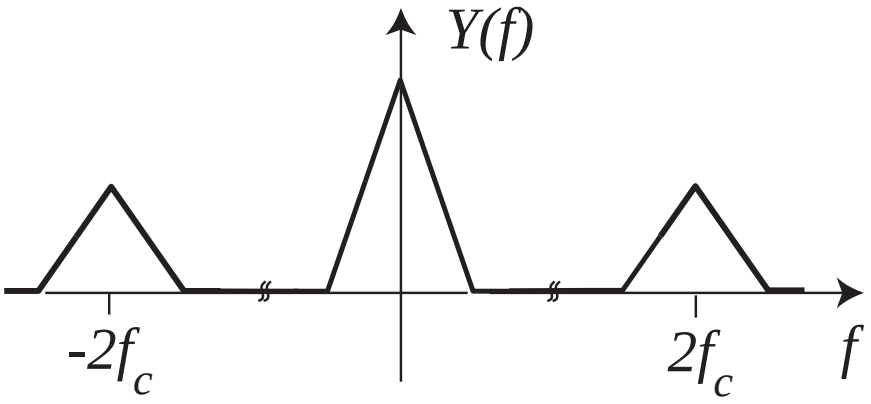
where $w(t) = \cos(2\pi f_c t)$ is the carrier signal, and $u(t)$ is the modulating signal. The signal is to be demodulated by multiplying by $\cos(2\pi f_c t)$, so that $z(t) = \cos(2\pi f_c t)y(t)$. Sketch the spectrum of $z(t)$ on a 3×5 card.

My confidence that I have the correct answer is:

1. 100%
2. 80%
3. 60%
4. 40%
5. 20%
6. 0%

Coherent Demodulation

The transform of $z(t)$ is given by:



My answer

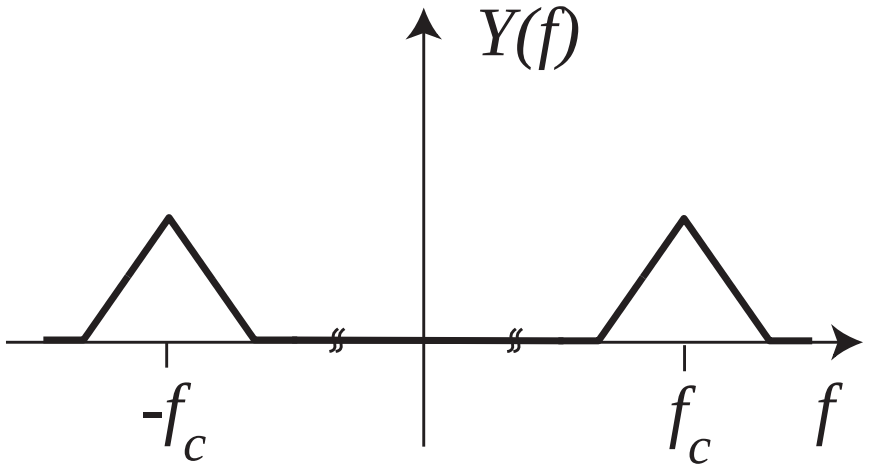
1. Was completely correct
2. Was mostly correct, with one or two minor errors
3. Had many errors
4. Was completely incorrect

Coherent Demodulation with Phase Error

Consider the signal

$$y(t) = \cos(2\pi f_c t)u(t)$$

where $w(t) = \cos(2\pi f_c t)$ is the carrier signal, and $u(t)$ is the modulating signal. The modulated signal, $y(t)$, has spectrum (Fourier transform) as shown below:



The signal is to be demodulated by multiplying by $\sin(2\pi f_c t)$, so that $z(t) = \sin(2\pi f_c t)y(t)$. Sketch the spectrum of $z(t)$ on a 3×5 card.

Coherent Demodulation with Phase Error

Consider the signal

$$y(t) = \cos(2\pi f_c t)u(t)$$

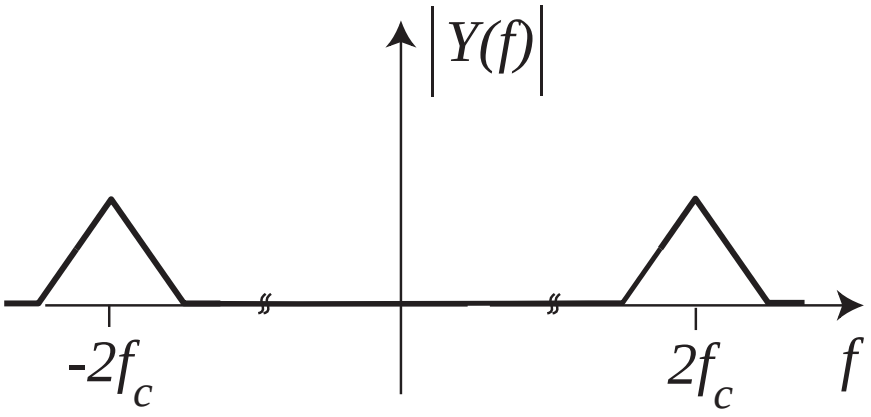
where $w(t) = \cos(2\pi f_c t)$ is the carrier signal, and $u(t)$ is the modulating signal. The signal is to be demodulated by multiplying by $\sin(2\pi f_c t)$, so that $z(t) = \sin(2\pi f_c t)y(t)$. Sketch (the absolute value of) the spectrum of $z(t)$ on a 3×5 card.

My confidence that I have the correct answer is:

1. 100%
2. 80%
3. 60%
4. 40%
5. 20%
6. 0%

Coherent Demodulation with Phase Error

The transform of $z(t)$ is given by:



My answer

1. Was completely correct
2. Was mostly correct, with one or two minor errors
3. Had many errors
4. Was completely incorrect