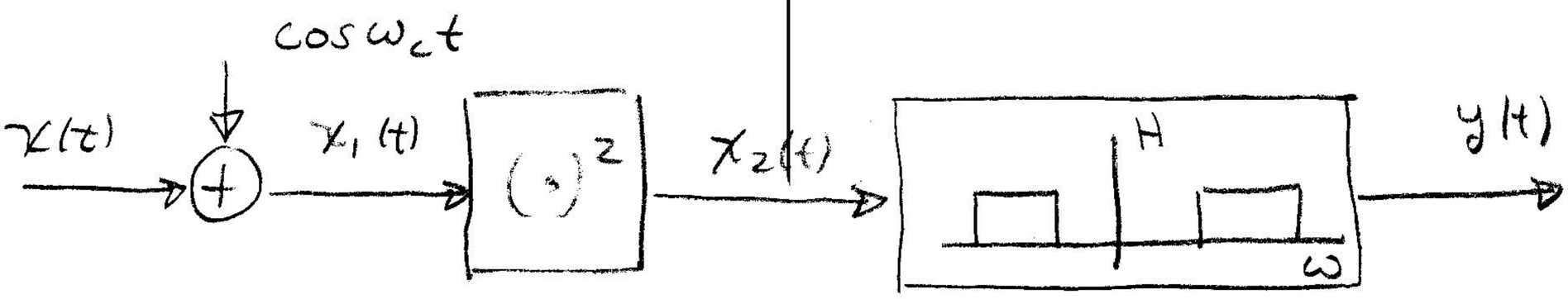
Redraw the block diagram:



Take each signal in turn:

$$x_1(t) = x(t) + \cos \omega_c t$$

$$\Rightarrow X_1(f) = X(f) + \frac{1}{2}\left(\delta(f-f_c) + \delta(f+f_c)\right)$$

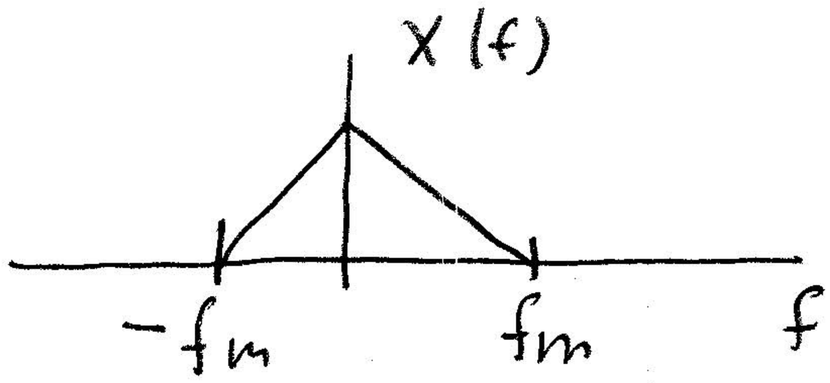
where $f_c = \omega_c / 2\pi$

$x_2(t)$ is $x_1^2(t)$, so

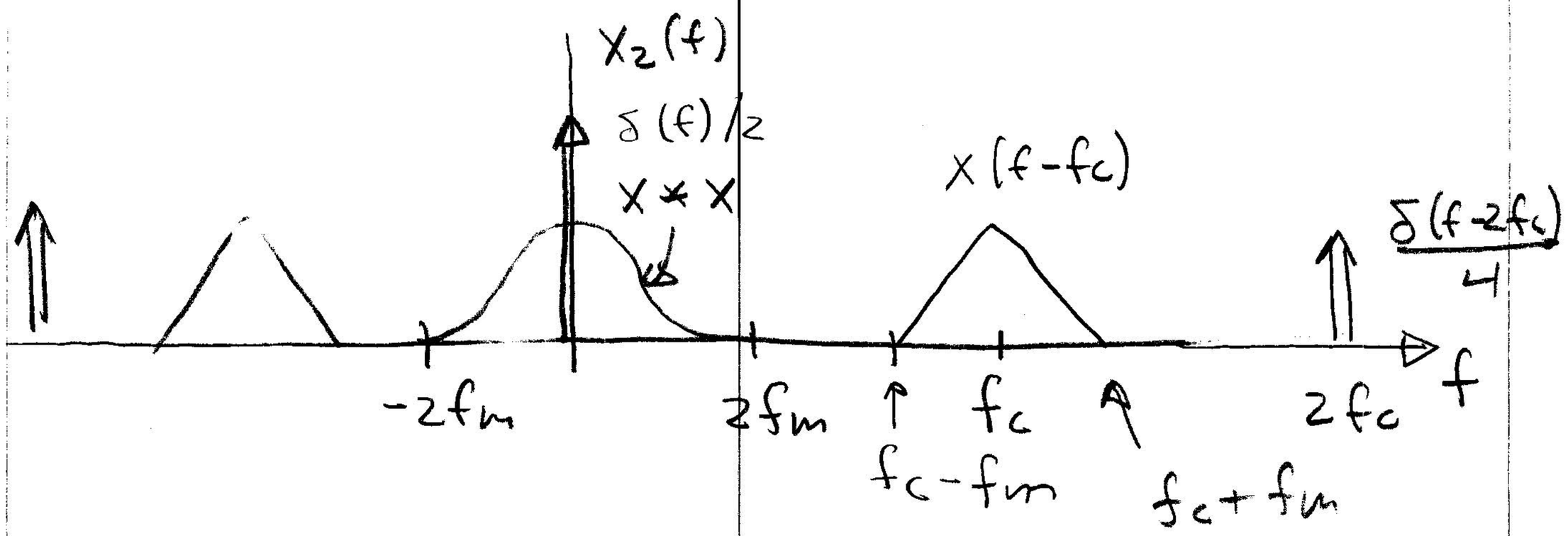
$$X_2(f) = X_1(f) * X_1(f)$$

$$= X(f) * X(f) + X(f-f_c) + X(f+f_c)$$
$$+ \frac{1}{4}\left[\delta(f-2f_c) + \delta(f+2f_c)\right]$$
$$+ \frac{1}{2}\delta(f)$$

Suppose $X(f)$ is



What does $X_2(f)$ look like?



Therefore, if we want

$$y(t) = x(t)\cos\omega_c t$$

$$\Rightarrow Y(f) = \frac{X(f-f_c)}{2} + \frac{X(f+f_c)}{2}$$

then we can take

$f_l = f_c - f_m$ $\quad (\omega_l = \omega_c - \omega_m)$

$f_h = f_c + f_m$ $\quad (\omega_h = \omega_c + \omega_m)$

$A = 1/2$

We also require that

$$f_c - f_m > 2f_m$$

$$\Rightarrow f_c > 3f_m$$

in order to have no overlap