5-1-1 A. $H(s) \Rightarrow H(j\omega) = \frac{j\omega}{j\omega+3}$.

$\omega \to 0 \quad H(j\omega) \to 0$

$\omega \to \infty \quad H(j\omega) \to 1$

5-1-2 $h[n]$ 是带阻滤波

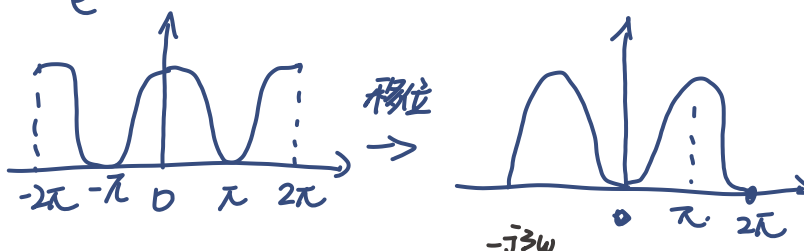
带阻滤波 在中心频率幅频最低

对 $(-1)^n$

$(-1)^n x[n] \overset{ZT}{\longleftrightarrow} X(-z)$

$(-1)^n x[n] \overset{DTFT}{\longleftrightarrow} X(e^{j(\omega-\pi)})$

$e^{j\pi n}$



5-1-10 (1) $H(j\omega) = \begin{cases} e^{-j3\omega} & |\omega| < 6\ rad/s \\ 0 & |\omega| > 6\ rad/s \end{cases}$

$\sin t - \cos 6t \overset{F}{\longleftrightarrow} \frac{1}{2\pi} \frac{\pi}{j}[\delta(\omega-1)-\delta(\omega+1)] * \pi[\delta(\omega-6)+\delta(\omega+6)]$

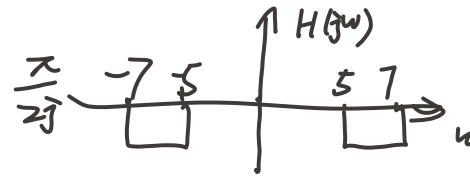
$= \frac{\pi}{2j}(\delta(\omega-7)-\delta(\omega-5)+\delta(\omega+5)-\delta(\omega+7))$

$(-jt)^{-1} x(t) \overset{F}{\longleftrightarrow} \frac{d^{-1}X(j\omega)}{d\omega^{-1}}$

$\frac{j}{t}$ (t) $\overset{F}{\longleftrightarrow}$ $\frac{\pi}{j}$ $\{u(w-7)-u(w-5)$
$=[\delta(w+7)-\delta(w+5)]\}$

∴ $h(t)$.

優3吧 啊啊的
Sa函数都忘3

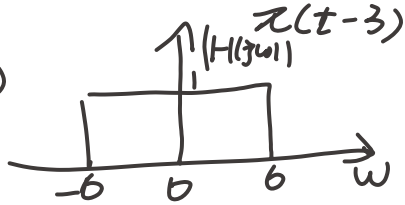


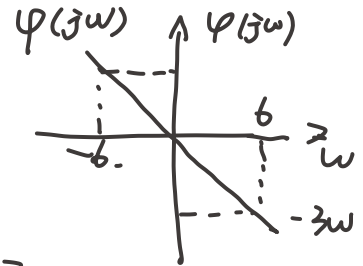
$$H(jw)= e^{-j3w}[u(w-6)-u(w+6)]$$

$$\therefore h(t)= \delta(t-3) * \frac{\sin 6t}{\pi t}.$$

$$= \frac{\sin(6t-18)}{\pi(t-3)}$$

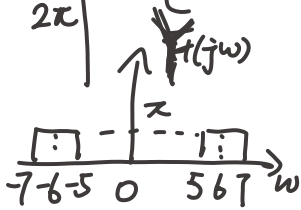
(2)



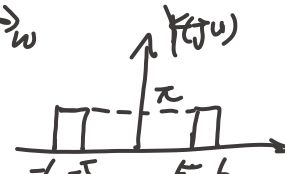


$$Y(jw)=\frac{1}{2\pi}\{2\pi[u(w+1)-u(w-1)] * \pi[\delta(w-6)+\delta(w+6)]\}$$

=



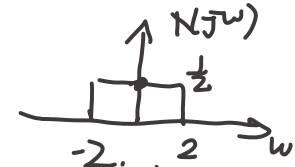
$Y(jw)= F(jw)H(jw)$



5-2 调制模型（难题）

5-21.

$x(t)=\frac{\sin 2t}{2\pi t}$　$s(t)=\cos 1000t$



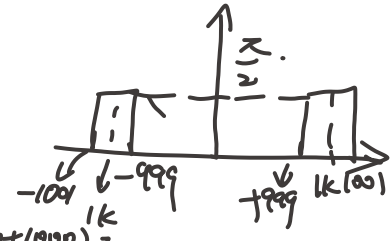
$\therefore X(j\omega)=\frac{1}{2}\cdot\left[u(\omega+2)-u(\omega-2)\right]$

$s(t)\xrightarrow{\mathcal{F}}\pi\left(\delta(\omega-1000)+\delta(\omega+1000)\right)$

$W(t)=s(t)\cdot x(t)$

W(t) 时域

$Y(j\omega)=W(j\omega)\,H(j\omega)$



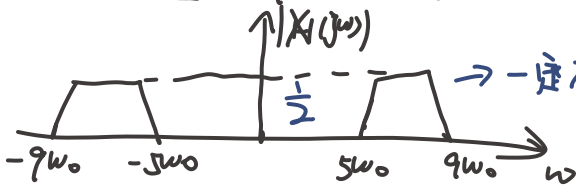
$=\frac{\pi}{2}\left[\delta(\omega-1000)+\delta(\omega+1000)\right]$

$*\left[u(\omega-1)-u(\omega+1)\right]$

$\therefore y(t)=\pi\cdot\frac{\sin t}{\pi t}\cos 1000t=\frac{\sin t}{t}\cos 1000t.$

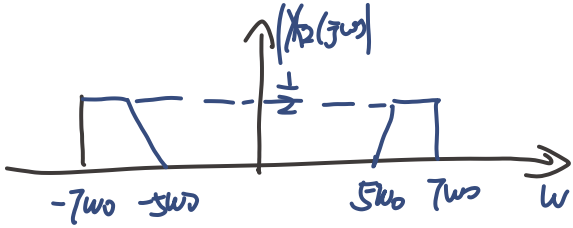
5-2-5. 经过 $\cos(7\omega_0 t)$ 调制.

$$X_1(j\omega) = \frac{1}{2}F(j(\omega-7\omega_0)) + \frac{1}{2}F(j(\omega+7\omega_0))$$

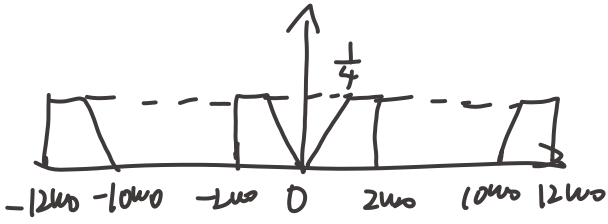


→ 一定不要忘了模大小!!!

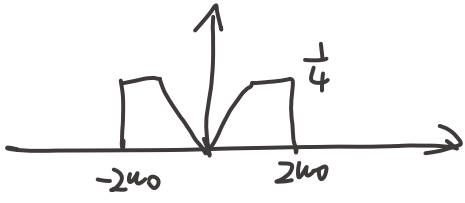
$$X_2(j\omega) = X_1(j\omega)\,H_1(j\omega)$$



$$X_3(j\omega) = \frac{1}{2}X_2\left(j(\omega-5\omega_0)\right) + \frac{1}{2}X_2\left(j(\omega+5\omega_0)\right)$$



$$Y(j\omega) = H_2(j\omega)\cdot X_3(j\omega)$$



所谓计算过程
其实也没啥
图作好即可
表达写好!!!