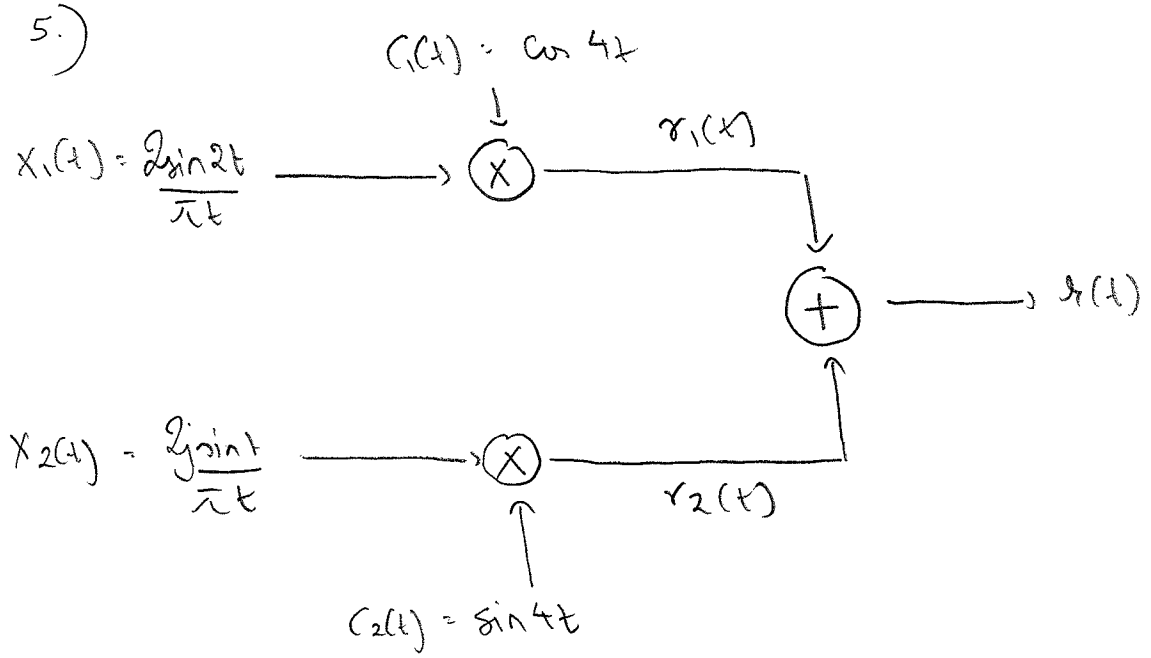
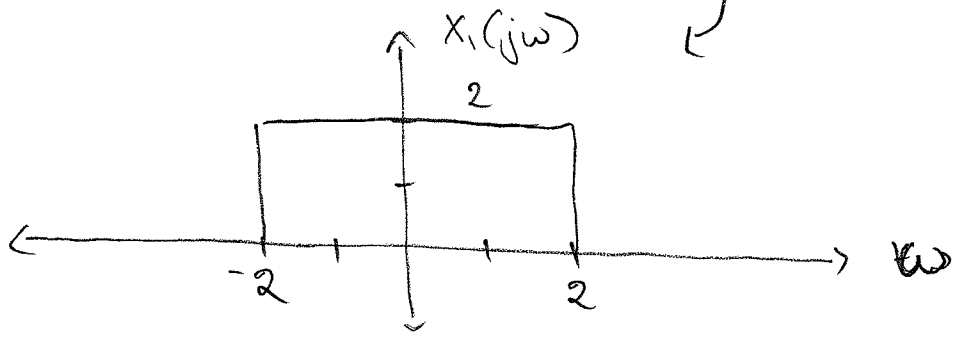
5.)

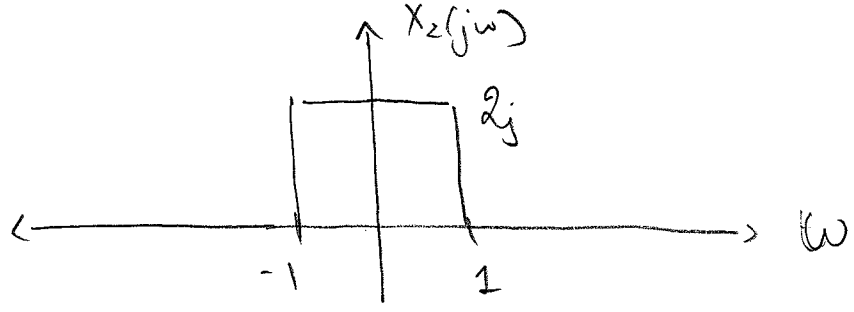


1.) $x_1(t) = \dfrac{2\sin 2t}{\pi t}$ Table 4.2



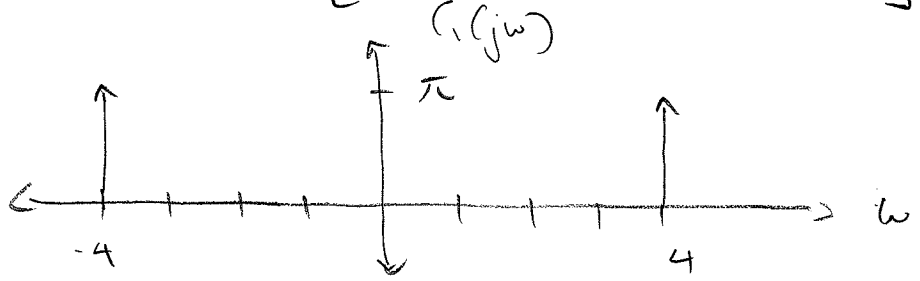
2.) $x_2(t) = 2j\,\dfrac{\sin t}{\pi t}$

$$X_2(j\omega) = \begin{cases} 2j & |\omega| < 1 \\ 0 & |\omega| > 1 \end{cases}$$



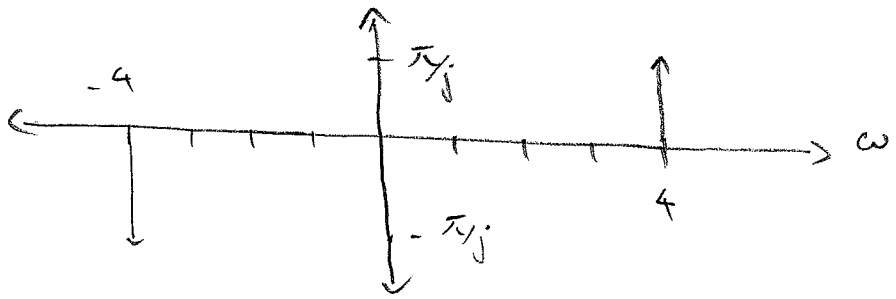
3.) $c_1(t) = \cos 4t$

$$C_1(j\omega) = \pi \left[\delta(\omega - 4) + \delta(\omega + 4) \right]$$



4.) $c_2(t) = \sin 4t$

$$C_2(j\omega) = \frac{\pi}{j} \left[\delta(\omega - 4) - \delta(\omega + 4) \right]$$

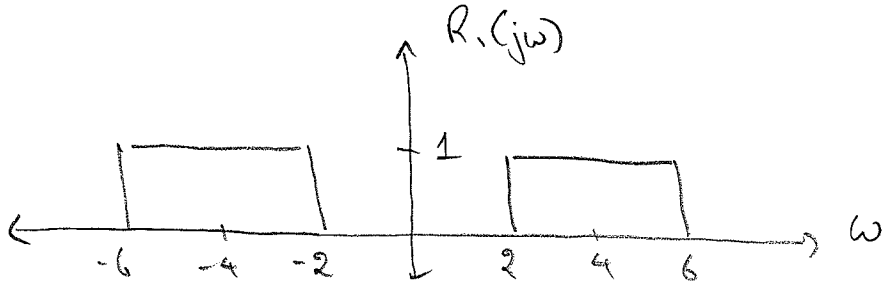


5.) $r_1(t) = x_1(t) \cdot c_1(t)$

$$= \frac{2 \sin 2t}{\pi t} \cdot \cos 4t$$

$$R_1(j\omega) = \frac{1}{2\pi} \left[2 X_1(j\omega) * \pi \{ \delta(\omega - 4) + \delta(\omega + 4) \} \right]$$

$$= X_1 \left[j(\omega - 4) \right] + X_1 \left[j(\omega + 4) \right]$$

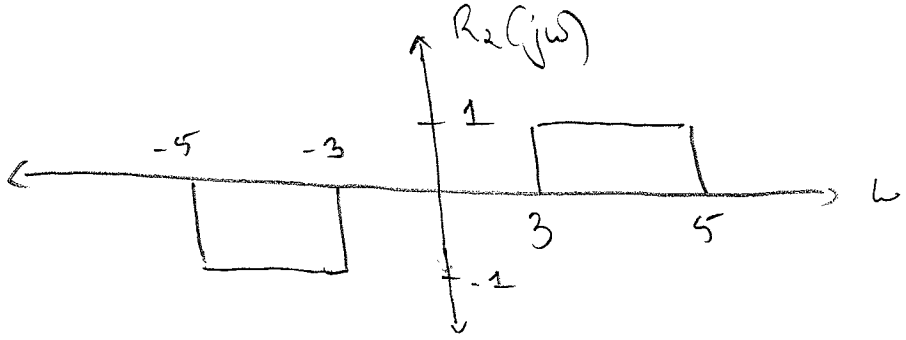


6.) $r_2(t) = x_2(t)\, c_2(t)$

$= \frac{2j \sin t}{\pi t} \cdot \sin 4t$

$R_2(j\omega) = \frac{1}{2\pi}\left[2\pi X_2(j\omega) * \pi\{\delta(\omega-4) - \delta(\omega+4)\}\right]$

$= X_2\{j(\omega-4)\} - X_2\{j(\omega+4)\}$



7.) $r(t) = r_1(t) + r_2(t)$

$R(j\omega) = R_1(j\omega) + R_2(j\omega)$