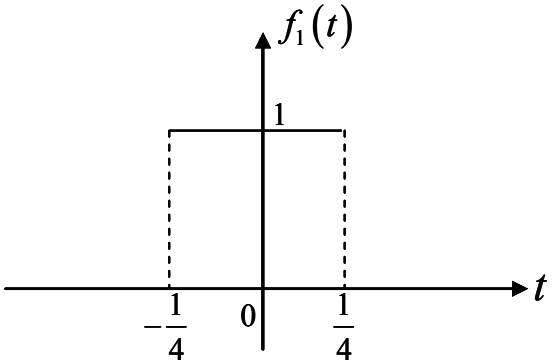
電気数学Ⅱ　小テスト９　解答例

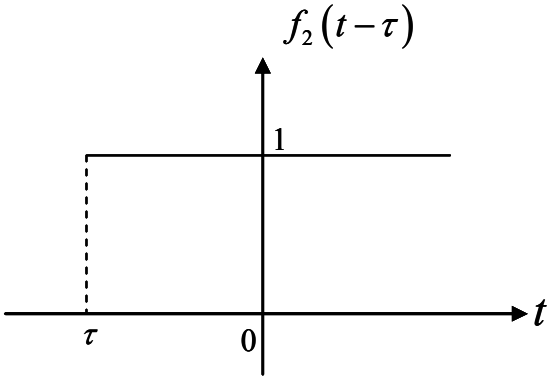
2011.6.10　黒川

１．

(1)



(2)

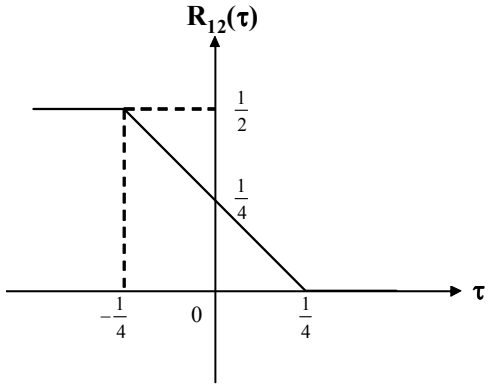


(3)　$\tau < -\frac{1}{4}$　では、$R_{12}(\tau) = \int_{-\infty}^{\infty} f_1(t) f_2(t-\tau)\,dt = \int_{-1/4}^{1/4} 1\,dt = \frac{1}{2}$

$-\frac{1}{4} \le \tau < \frac{1}{4}$　では、$R_{12}(\tau) == \int_{\tau}^{1/4} 1\,dt = \frac{1}{4} - \tau$

$\tau \ge \frac{1}{4}$　では、$R_{12}(\tau) = 0$

(4)



２．

(1)

$$F(\omega) = \frac{1}{2 + j\omega}$$

(2)

$$P(\omega) = \frac{1}{2 + j\omega} \cdot \left[\frac{1}{j\omega} + \pi\delta(\omega) \right] = \frac{1}{(2 + j\omega) j\omega} + \frac{\pi}{2}\delta(\omega)$$

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

(3)

$$f(t) * g(t) = F^{-1}\left[P(\omega)\right] = \frac{1}{2}u(t) - \frac{1}{2}e^{-2t}u(t)$$

$$= \frac{1}{2}\left[1 - e^{-2t}\right]u(t)$$