Quiz1.

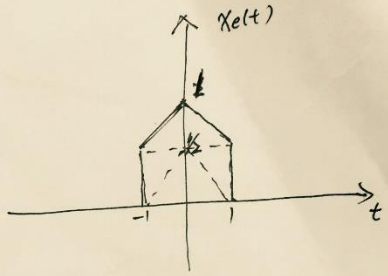
1. b b c a a b b,c

2. Solution:

$$x_e(t) = \frac{x(t)+x(-t)}{2}$$

$$x(t) = \begin{cases} t+1, & -1\le t\le 0 \\ 1, & 0<t\le 1 \\ 0, & \text{otherwise.} \end{cases} \Rightarrow x(-t) = \begin{cases} 1, & -1\le t<0 \\ -t+1, & 0\le t\le 1 \\ 0, & \text{otherwise} \end{cases}$$

$$\therefore x_e(t) = \begin{cases} \frac{t}{2}+1, & -1\le t<0 \\ -\frac{t}{2}+1, & 0\le t\le 1 \\ 0, & \text{otherwise.} \end{cases}$$

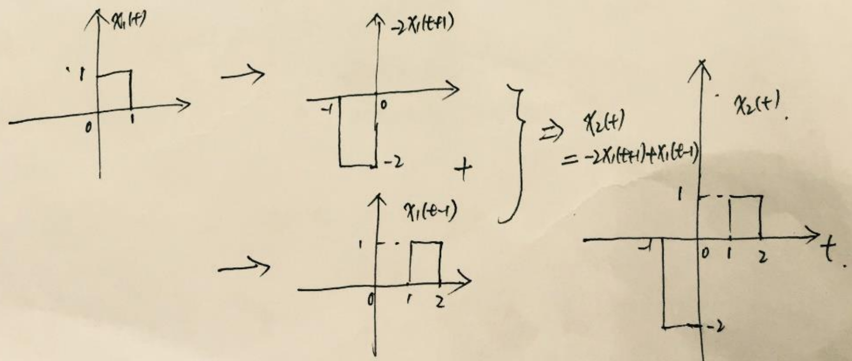


3. Solution:

LTI 系统

$$y_2(t) = -2y_1(t+1)+y_1(t-1).$$

$$\therefore x_2(t) = -2x_1(t+1)+x_1(t-1).$$



$$x_2(t) = \begin{cases} -2, & -1\le t\le 0 \\ 1, & 1\le t\le 2 \\ 0, & \text{otherwise.} \end{cases}$$

Quiz1

4. Solution:

$$2e^{2t} * e^{-2t}u(t)$$

$$= \int_{-\infty}^{\infty} 2\cdot e^{2\tau}\cdot e^{-2(t-\tau)}\cdot u(t-\tau)\, d\tau$$

$$= 2\cdot e^{-2t}\int_{-\infty}^{\infty} e^{4\tau}\cdot u(t-\tau)\, d\tau$$

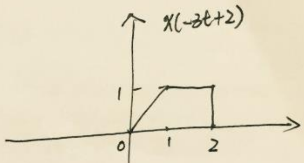
$$= 2\cdot e^{-2t}\int_{-\infty}^{t} e^{4\tau}\cdot 1\, d\tau$$

$$= 2\cdot e^{-2t}\cdot \frac{1}{4}e^{4\tau}\Big|_{-\infty}^{t}$$

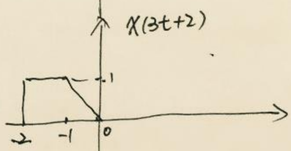
$$= \frac{1}{2}e^{2t}$$

5. Solution:

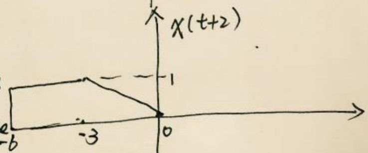
$$x(-3t+2) = \begin{cases} t, & 0\le t\le 1 \\ 1, & 1<t\le 2 \\ 0, & \text{otherwise.} \end{cases}$$



$$x(-3t+2) \xrightarrow{t\to -t} x(3t+2) = \begin{cases} -t & -1\le t\le 0 \\ 1, & -2\le t< -1 \\ 0, & \text{otherwise} \end{cases}$$



$$x(3t+2) \xrightarrow{t\to \frac{1}{3}t} x(t+2) = \begin{cases} -\frac{1}{3}t, & -3\le t\le 0 \\ 1, & -6\le t< -3 \\ 0, & \text{otherwise} \end{cases}$$



$$x(t+2) \xrightarrow{t\to t-2} x(t) = \begin{cases} -\frac{1}{3}(t-2), & -1\le t\le 2 \\ 1 & , -4\le t< -1 \\ 0 & , \text{otherwise} \end{cases}$$