زهرا صلحی مهدی آباد
۹۹۳۰۱۴۳
باغ عربی بری سوم

8

(i) کانولوشن

$$x[n] = \delta[n] + 2\delta[n+1]$$

$$h[n] = 2\delta[n+1] - \delta[n-2]$$

9

$$x[n+1] * h[n-1]$$

10

$$x[n+1] = \delta[n+1] + 2\delta[n+2]$$

$$h[n-1] = 2\delta[n] - \delta[n-3]$$

11

$$x[n+1] * h[n-1] = \sum_{k=-\infty}^{k=\infty} x[k+1]\, h[n-1]$$

12

$$= \sum_{k=-\infty}^{\infty} \left(\delta[k+1] + 2\delta[k+2]\right)\left(2\delta[n] - \delta[n-3]\right)$$

13

$$= \left(2\delta[n] - \delta[n-3]\right) \sum_{k=-\infty}^{\infty} \delta[k+1] + 2\delta[k+2]$$

14

$$\left(2\delta[n] - \delta[n-3]\right) \sum_{k=-\infty}^{\infty} \delta[k+1] + \left(2\delta[n] - \delta[n-3]\right)$$

15

$$\sum_{k=-\infty}^{\infty} 2\delta[k+2] \quad .$$

16

17

18

$$h[n] = 2^n u[-n+2]$$

$$g[n] = \left(\frac{1}{2}\right)^{n-1} \left(u[n] - u[n-10]\right)$$

$$h_K[n] = 2^n u[-n+2]$$

$$g[K] = \left(\frac{1}{2}\right)^{K-1} \left[u[K] - u[K-10]\right]$$

$$y[n] = \sum_{K=-\infty}^{\infty} g[K]\, h[n-K]$$

$$y[n] = \sum_{K=-\infty}^{\infty} \left(\frac{1}{2}\right)^{K-1} \left[u[K] - u[K-10]\right] 2^n u[-n+2]$$

$$= 2^n u[-n+2] \sum_{K=-\infty}^{\infty} \left(\frac{1}{2}\right)^{K-1} u[K]$$

$$- 2^n u[-n+2] \sum_{K=-\infty}^{\infty} \left(\frac{1}{2}\right)^{K-1} u[K-10]$$

$$= 2^n u[-n+2] \sum_{K=0}^{\infty} 1 \times \left(\frac{1}{2}\right)^{K-1} - 2^n u[-n+2] \sum_{K=10}^{\infty} 1 \times \left(\frac{1}{2}\right)^{K-1}$$

آذر

(۳)

$$h(t) = e^{t+1}(u(t) - u(t-5))$$

$$x(t) = 2e^{t-1}u(-t)$$

$$y(t) = \int_{-\infty}^{\infty} x(\lambda)\, h(t-\lambda)\, d\lambda$$

$$y(t) = \int_{-\infty}^{\infty} 2e^{\lambda-1}u(-\lambda)\, e^{(\lambda+1)}(u(t-\lambda) - u(\lambda-5))$$

$$y(t) = \int_{-\infty}^{\infty} 2e^{\lambda-1}u(-\lambda)\, e^{(\lambda+1)}\, u(t-\lambda)$$

$$- \int_{-\infty}^{\infty} 2e^{\lambda-1}u(-\lambda)\, e^{(\lambda+1)}\, u(\lambda-5)$$

$$= 2\int_{-1}^{t} e^{\lambda-1}e^{\lambda+1} - 2\int_{5}^{t} e^{\lambda-1}e^{\lambda+1} = 2\int_{-1}^{t} e^{2\lambda} - 2\int_{5}^{t} e^{2\lambda}$$

$$= 2\left(\tfrac{1}{2}e^{2\lambda}\right)\Big|_{-1}^{t} - 2\left(\tfrac{1}{2}e^{2\lambda}\right)\Big|_{5}^{t}$$

$$= (e^{2t} - e^{-2}) + (e^{2t} - (-e^{10})) = e^{10} - e^{-2}$$

$$h[n] = \left(\frac{1}{2}\right)^n u[n]$$

$$g[n] = u[n] - 2\,[n-2] + u[n-4]$$

$$y[n] = \sum_{k=-\infty}^{\infty} \left(u[k] - 2u[k-2] + u[k-4]\right)$$

$$\left(\frac{1}{2}^{(n)}\ u[n]\right)$$

$$= \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^n u[n]\ u[k] - 2\sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^n u[n]\ u[k-2]$$

$$+ \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^n u[n] + u[k-4]$$

$$= \sum_{k=0}^{n} \left(\frac{1}{2}\right)^n u[n] - 2\sum_{k=2}^{n} \left(\frac{1}{2}\right)^n u[n] + \sum_{k=4}^{n} \left(\frac{1}{2}\right)^n u[n]$$

$$= \left(\frac{\left(\frac{1}{2}\right)^0 - \left(\frac{1}{2}\right)^{n+1}}{1-\frac{1}{2}}\right) u[n] - 2\left(\frac{\left(\frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^{n+1}}{1-\frac{1}{2}}\right) u[n]$$

$$+ \left(\frac{\left(\frac{1}{2}\right)^4 - \left(\frac{1}{2}\right)^{n+1}}{1-\frac{1}{2}}\right) u[n]$$

آذر

$$= \left(2(1) - 2\left(\tfrac{1}{2}\right)^{n+1}\right)u[n] + \left(-4\left(\tfrac{1}{4}\right) - 4\left(-\tfrac{1}{2}\right)^{n+1}\right)$$

$$u[n] + \left(2\left(\tfrac{1}{1-\frac{1}{4}}\right) - 2\left(\tfrac{1}{2}\right)^{n+1}\right)u[n]$$

$$= \left(2 - 2\left(\tfrac{1}{2}\right)^{n+1}\right)u[n] + \left(-1 - 4\left(-\tfrac{1}{2}\right)^{n+1}\right)u[n]$$

$$+ \left(\tfrac{1}{2^2} - 2\left(\tfrac{1}{2}\right)^{n+1}\right)u[n]$$

شهادت آیت ا... دکتر محمد مفتح (۱۳۵۸ هـ ش) - روز وحدت حوزه و دانشگاه

جمعه ۲۸

آذر