منصوره باتمرکاریان دکادی

شماره دانشجویی: 9921143

Date Subject

سری سوم تکلیف تجزیه و تحلیل سیستم ها

②

$$h[n] = (3)^{n} u[-n+2]$$

$$h[n-k] = (3)^{n-k} u[-(n-k)+2]$$

$$\boxed{h[n-k] = (3)^{n-k} u[-n+k+2]}$$

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

$$\boxed{x[k] = \left(\frac{1}{2}\right)^{k-1} (u(k) - u(k-10))}$$

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

$$y[n] = \sum_{k=-\infty}^{+\infty} \left(\frac{1}{2}\right)^{k-1} (u[k] - u[k-10]) \cdot (3)^{n-k} u[-n+k+2]$$

$u[-n+k+2]$ $\quad -n+k+2<0$

$k<n-2$

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

$$-\sum_{k=-\infty}^{+\infty} \left(\frac{1}{2}\right)^{k-1} (3)^{n-k} u[k-10]\, u[-n+k+2]$$

$$= \sum_{k=0}^{n-2} \left(\frac{1}{2}\right)^{k-1} (3)^{n-k} - \sum_{k=10}^{n-2} \left(\frac{1}{2}\right)^{k-1} (3)^{n-k}$$

$$\left(\frac{1}{2}\right)^{k} \left(\frac{1}{3}\right)^{k} = \left(\frac{1}{6}\right)^{k} = (6^{-k})$$

$$= (3^n)(2) \sum_{k=0}^{n-2} (6^{-k}) - (3^n)(2) \sum_{k=10}^{n-2} (6^{-k})$$

$$(2)(3^n) \frac{(6^{-1})^0 - (6^{-1})^{n-1}}{1-6^{-1}} - (2)(3^n) \frac{(6^{-1})^{10} - (6^{-1})^{n-1}}{1-6^{-1}}$$

$$(2)(3^n)\left(\frac{1-6^{1-n}}{1-6^{-1}} u[n] - \frac{6^{-10}-6^{1-n}}{1-6^{-1}} u[n-10] \right)$$

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

$$h(\lambda)=e^{\lambda+1}\left(u(\lambda)-u(\lambda-5)\right)$$

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

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

$$e^{t-(\lambda+1)}=\frac{e^{t}}{e^{\lambda+1}}$$

$$-t+\lambda<0 \rightarrow \lambda<t$$

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

$$2e^{t}\int_{0}^{t} d\lambda - 2e^{t}\int_{5}^{t} d\lambda$$

$$2e^{t}\left((t-0)\,u(t)-(t-5)\,u(t-5)\right)$$

$$y(t)=2e^{t}\left(t\,u(t)-(t-5)\,u(t-5)\right)$$

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$$x[n] = u[n] - 2u[n-2] + u[n-6]$$

$$\boxed{x[k] = u[k] - 2u[k-2] + u[k-6]}$$

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

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

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

$$\frac{\left(\frac{1}{2}\right)^n}{\left(\frac{1}{2}\right)^k}$$

$$\sum_{k=0}^{n} \left(\frac{1}{2}\right)^{n-k} - 2\sum_{k=2}^{n} \left(\frac{1}{2}\right)^{n-k} + \sum_{k=6}^{n} \left(\frac{1}{2}\right)^{n-k}$$

$$\left(\frac{1}{2}\right)^n \left(\sum_{k=0}^{n} 2^k - 2\sum_{k=2}^{n} 2^k + \sum_{k=6}^{n} 2^k \right)$$

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$$\left(\frac{1}{2}\right)^n\left(\frac{2^0-2^{n+1}}{1-2}-2\,\frac{2^2-2^{n+1}}{1-2}+\frac{2^6-2^{n+1}}{1-2}\right)$$

$$\left(\frac{1}{2}\right)^n\left(\frac{1-2\times 2^n}{-1}-2\,\frac{4-2\times 2^n}{-1}+\frac{64-2\times 2^n}{-1}\right)$$

$$(2^{-n})(-1+2\times 2^n)+(2^{-n})(8-4\times 2^n)+(2^{-n})(-64+2\times 2^n)$$

$$y[n]=(-2^{-n}+2)\,u[n]+(2^{3-n}-4)\,u[n-2]+(-2^{6-n}+2)\,u[n-6]$$

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