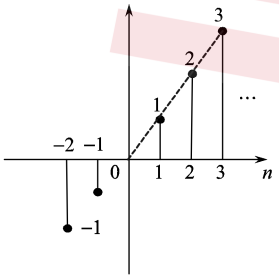
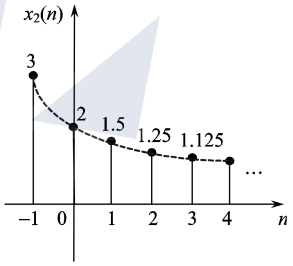
第 5 章

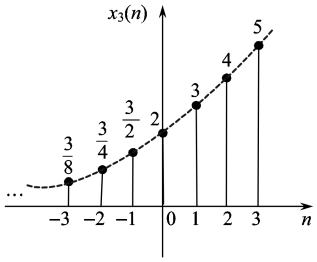
5.1



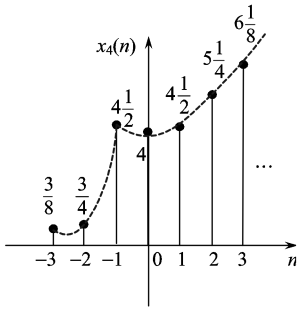
(1)



(2)



(3)



(4)

5.2

(1) $(n-1)\left[u(n-1)-u(n-5)\right]$

(2) $2\left[u(n-3)-u(n-6)\right]$

(3) $(-1)^{n-1}u(n-1)$

(4) $-u(n)-2u(n-3)-u(n-6)$

5.3

(1) 周期序列，周期为 14

(2) 非周期序列

5.4

(1) $3^{-n}u(n)$

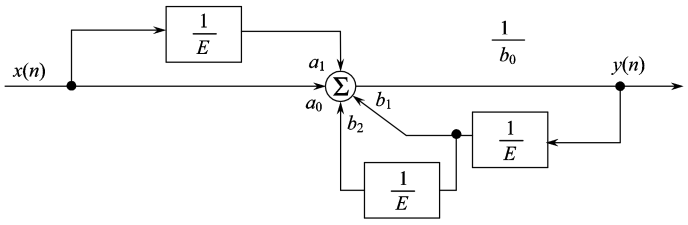
(2) $\dfrac{3-3^{-n}}{2}u(n)$

(3) $\dfrac{1}{2(3^n)}\left\{(3^{n+1}-1)\left[u(n)-u(n-5)\right]+(3^5-1)u(n-5)\right\}=\dfrac{3-3^{-n}}{2}\left[u(n)-u(n-5)\right]+\dfrac{121}{3^n}u(n-5)$

5.5 $y(n)-ay(n-1)+by(n-2)=x(n)$，二阶系统

5.6 $y(n)-b_1y(n-1)-b_2y(n-2)=a_0x(n)+a_1x(n-1)$，二阶系统

5.7



5.8

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

(2) $2(2)^n$

(3) $(-3)^{n-1}$；(4) $\frac{1}{3}\left(-\frac{1}{3}\right)^n$

5.9

(1) $4(-1)^n-12(-2)^n$

(2) $(2n+1)(-1)^n$

(3) $\cos\left(\frac{n\pi}{2}\right)+2\sin\left(\frac{n\pi}{2}\right)$

5.10

(1) $(3)^n-(n+1)2^n,\quad n\geq 0$

(2) $2n-1+\cos\left(\frac{n\pi}{2}\right),\quad n\geq 0$

5.11 $\frac{13}{9}(-2)^n+\frac{1}{3}n-\frac{4}{9}$

5.12 $\left(-\frac{3}{4}n-\frac{9}{16}\right)(-1)^n+\frac{9}{16}(3^n)$

5.13

(1) $y(n)=\frac{1}{2}\sin n+\frac{1}{2}(\tan 1)(\cos n)-\frac{1}{2}(\tan 1)\left[\cos\left(\frac{n\pi}{2}\right)\right]=\frac{1}{2(1+\cos 2)}\left[\sin n+\sin(n+2)-\sin 2\cos\left(\frac{n\pi}{2}\right)\right]$

(2) $y(n)=-3n(-2)^n+(1+n)(-2)^n u(n)$

(3) $y(n)=-3n(-2)^n$

5.14

(1) $y(n)-7y(n-1)+10y(n-2)=14x(n)-85x(n-1)+111x(n-2)$

(2) $y(n)=2\left\{\left[2^n+3(5)^n+10\right]u(n)-\left[2^{n-10}+3(5^{n-10})+10\right]u(n-10)\right\}$

5.15 $y(n)-0.5y(n-1)=0$，$y(n)=10(0.5)^n u(n)$

5.16 差分方程 $y(n)-(1+\beta)y(n-1)=-x(n)$

(1) $y(n)=50\left[1-0.8(1.01)^{n+1}\right]u(n)$

(2) $k>21.4$，可取 $k=22$

(3)每月应还 $N=1.0588$ 万元

5.17

(1) $y\left(nT+\frac{T}{2}\right)=\frac{C_1}{C_1+C_2}x(nT)+\frac{C_2}{C_1+C_2}y(nT)$

(2) $y(n+1)-\frac{C_2}{C_1+C_2}y(n)=\frac{C_1}{C_1+C_2}x(n)$ 或 $y(n)-\frac{C_2}{C_1+C_2}y(n-1)=\frac{C_1}{C_1+C_2}x(n-1)$

(3) $y(n)=\left[1-\left(\frac{C_2}{C_1+C_2}\right)^n\right]u(n)$

5.18

(1) $h(n)=-\cos\frac{n\pi}{2}u(n-1)$

(2) $h(n)=\frac{6}{5}(6^{n+1}-1)u(n)$

(3) $h(n)=\frac{1}{2}\left[(\sqrt{2}+1)^{n-2}-(\sqrt{2}-1)^{n-2}\right]u(n-1)+\delta(n-1)$

(4) $h(n)=4(n-1)(0.5)^n u(n-1)$

5.19 $h_1(n)=0.4\delta(n)+0.6\delta(n-1)$，$h_2(n)=3^{n-2}u(n-2)$，$h(n)=-0.2\delta(n-2)+0.6(3)^{n-2}u(n-2)$

5.20 $h(n)=5(1-0.8^{n+1})u(n)-5(1-0.8^{n-2})u(n-3)$

5.21

(1) $h(n)=g(n)-g(n-1)$

(2) $g(n)=\sum_{k=0}^{\infty}h(n-k)$

5.22

(1) $y_{zs}(n)=(n+1)u(n)$

(2) $y_{zs}(n)=u(n)-u(n-3)$

(3) $y_{zs}(n)=(n+1)u(n)-2(n-3)u(n-4)+(n-7)u(n-8)$

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

5.23 $y_{zs}(n)=n0.5^{n-1}u(n)$

5.24

(1) $(n+1)u(n)$

(2) $(2-0.5^n)u(n)$

(3) $(3^{n+1}-2^{n+1})u(n)$

(4) $(n-1)u(n-1)$

5.25

(1) $y(n)=\delta(n)+3\delta(n-1)+4\delta(n-2)+3\delta(n-3)+\delta(n-4)$

(2) $y(n)=\delta(n+4)+2\delta(n+3)+\delta(n+2)+\delta(n+1)+2\delta(n)$

(3) $y(n)=\frac{\beta^{n+1}-\alpha^{n+1}}{\beta-\alpha}u(n)$

(4) $y(n)=\delta(n-2)$

5.26 $y(n)=\frac{1-0.8^{n+1}}{1-0.8}u(n)-\frac{1-0.8^{n-2}}{1-0.8}u(n-3)$