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2.A)

Replace the variable k with n (time invarience)

2.B) Input these variables A=0.5 B=2 a=-1 n0=1 into equation of 2.A

x3[n]=

3.1) x[n]=2µ[n]

x[-n]=2µ[-n] x[n] not even

-x[-n]=-2µ[-n] x[n] not odd neither

2µ[n]+ 2µ[-n])= u[n]+u[-n]

x[n]= u[n]+u[-n]+

x[n]= 2µ[n]

3.2) x[n]=cos(0.1n)

x[-n]=cos(-0.1n)=x[n] even

4.1) x(t)=-4t

-x(-t)=-(-4(-t))=-4t so its odd

4.2) x(t)=-µ(t-1)+µ(-t-1)

-x(-t)=µ(-t-1)+(-µ(t-1))=x(t) odd

5.A) 5sin(15t-(π/3)) To1= 2sin(7t) To2= x(t)= 5sin(15t-(π/3))+ 2sin(7t)

Ratio of Integers: (To1/ To2)=7/15 so the signal is periodic

Fundamental period of x(t)= 2π/1=2π

6.1) x[t]=cos(πt) T=0.125 seconds x[n]=cos(0.125πn)

x[n+n0]=cos(0.125π(n+n0))=cos(0.125πn+0.125πn0)

0.125πn0=πk

if k=1 then n0=8

number of periods is 1; number of samples is 8

6.2) x[t]=cos(πt) T=0.13 seconds x[n]=cos(0.13πn)

x[n+n0]=cos(0.13π(n+n0))=cos(0.13πn+0.13πn0)

0.13πn0=πk

if k=13 then n0=100

number of periods is 13; number of samples is 100

7)

Proof:

δ(an)=(1/a)δ(n)

let t-(t0/a)= u; dt=du because t0/a is a constant

Solution: