Introduction to Mathematica

#CA1

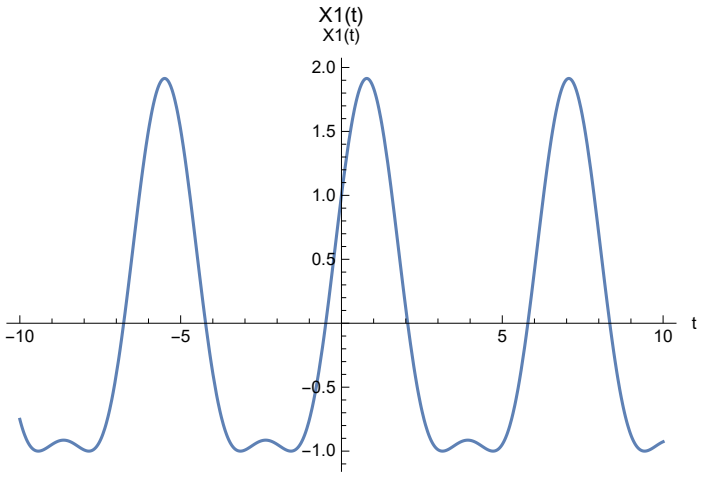
#Q2

Signals & Systems

Mohammad GharehHasanloo

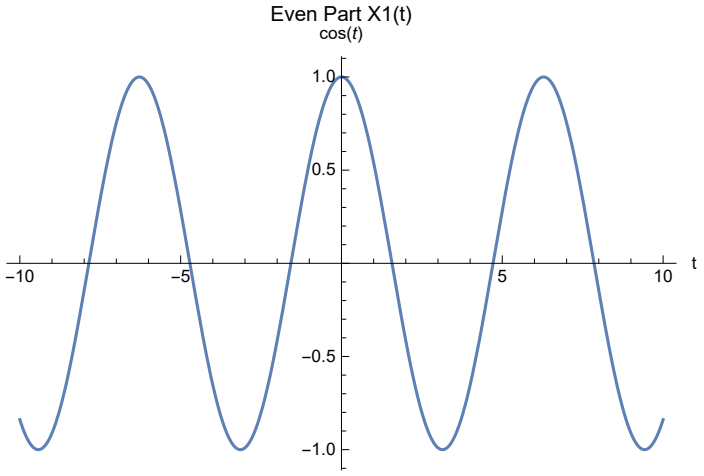
In[ ]:=
```
X1[t_] := Cos[t] + Sin[t] + (Cos[t]) * (Sin[t])
Plot[X1[t], {t, -10, 10}, PlotLabel → "X1(t)", AxesLabel → {"t", "X1(t)"}]

EX1 = (X1[t] + X1[-t]) / 2
Plot[EX1, {t, -10, 10}, PlotLabel → "Even Part X1(t)", AxesLabel → {"t", EX1}]

OX1 = (X1[t] - X1[-t]) / 2
Plot[OX1, {t, -10, 10}, PlotLabel → "Odd Part X1(t)", AxesLabel → {"t", OX1}]
```

Out[ ]=



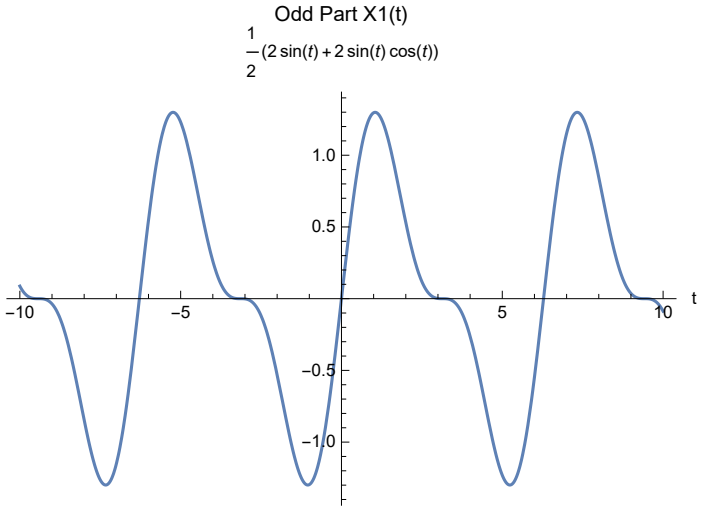
Out[ ]= Cos[t]

Out[ ]=



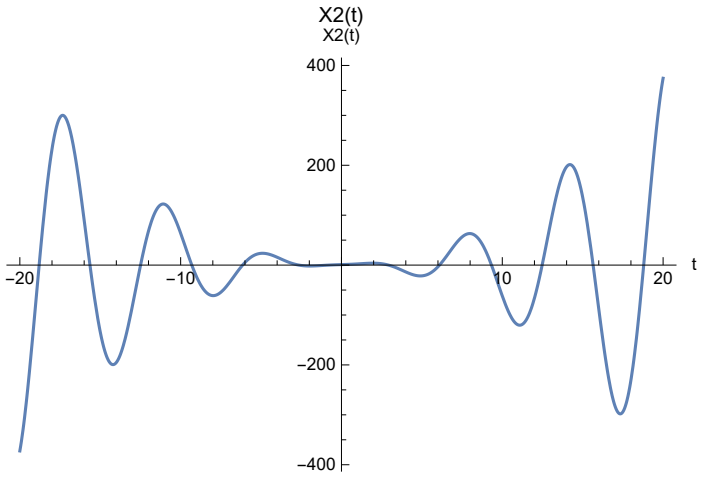
Out[•]= $\frac{1}{2}\left(2\,\text{Sin}[t] + 2\,\text{Cos}[t]\,\text{Sin}[t]\right)$

Out[•]=



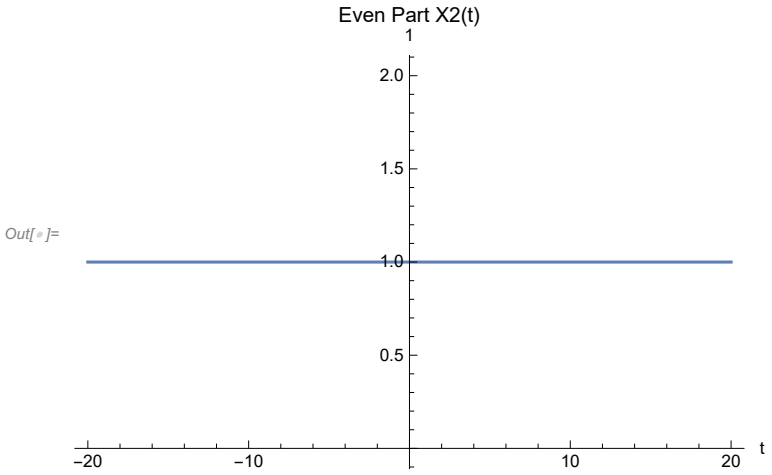
In[•]:=
```
X2[t_] := 1 + t * Cos[t] + (t^2) * Sin[t]
Plot[X2[t], {t, -20, 20}, PlotLabel → "X2(t)", AxesLabel → {"t", "X2(t)"}]

EX2 = (X2[t] + X2[-t]) / 2
Plot[EX2, {t, -20, 20}, PlotLabel → "Even Part X2(t)", AxesLabel → {"t", EX2}]

OX2 = (X2[t] - X2[-t]) / 2
Plot[OX2, {t, -20, 20}, PlotLabel → "Odd Part X2(t)", AxesLabel → {"t", OX2}]
```

Out[•]=



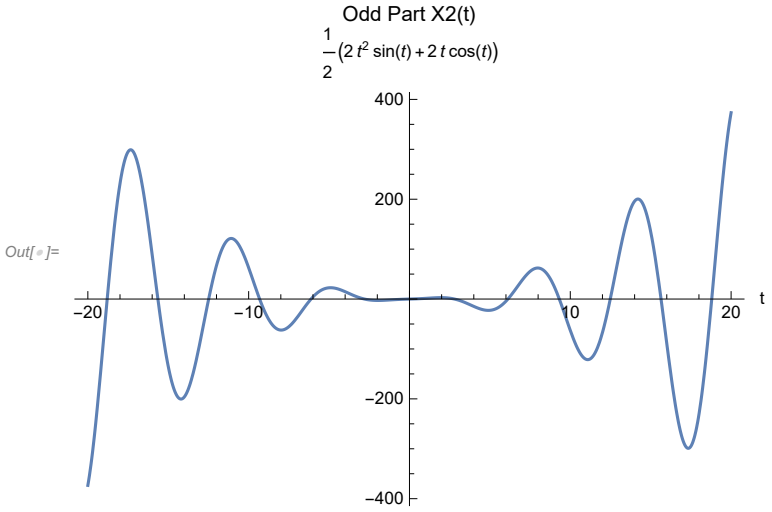
Out[•]= 1

Out[ ]=

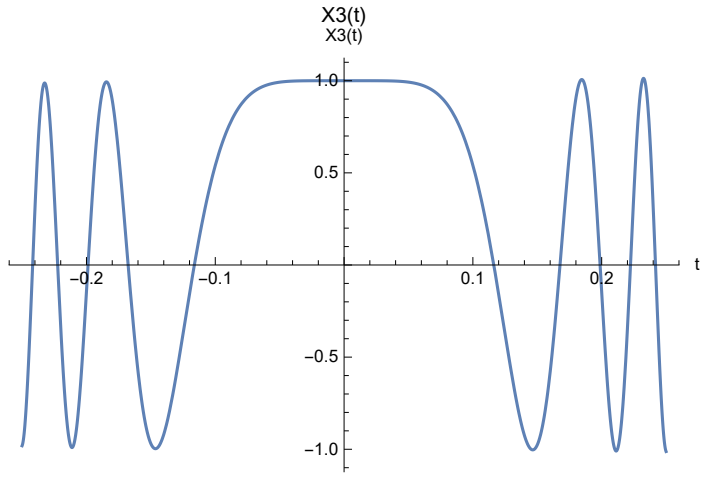


Out[ ]= $\frac{1}{2}\left(2\,t\,\text{Cos}[t]+2\,t^2\,\text{Sin}[t]\right)$

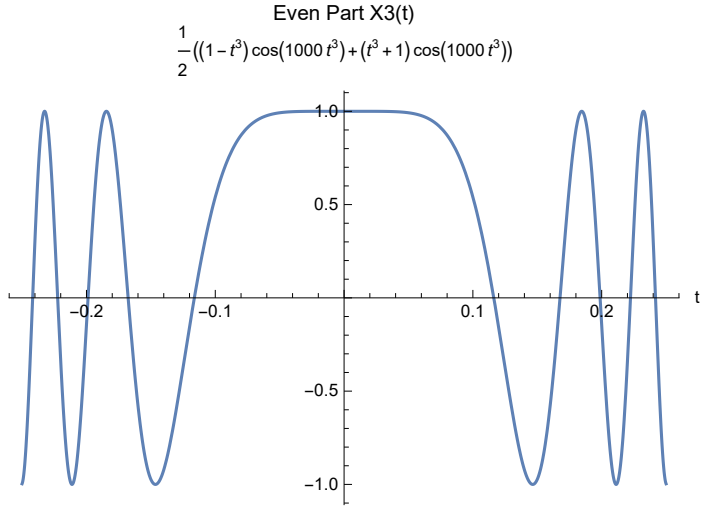
Out[ ]=



In[ ]:=
```
X3[t_] := (1 + t^3) * Cos[(10 * t)^3]
Plot[X3[t], {t, -0.25, 0.25}, PlotLabel → "X3(t)", AxesLabel → {"t", "X3(t)"}]

EX3 = (X3[t] + X3[-t]) / 2
Plot[EX3, {t, -0.25, 0.25}, PlotLabel → "Even Part X3(t)", AxesLabel → {"t", EX3}]

OX3 = (X3[t] - X3[-t]) / 2
Plot[OX3, {t, -0.25, 0.25}, PlotLabel → "Odd Part X3(t)", AxesLabel → {"t", OX3}]
```



Out[•]= $\frac{1}{2}\left(\left(1-t^3\right)\text{Cos}\left[1000\,t^3\right]+\left(1+t^3\right)\text{Cos}\left[1000\,t^3\right]\right)$



Out[•]= $\frac{1}{2}\left(-\left(1-t^3\right)\text{Cos}\left[1000\,t^3\right]+\left(1+t^3\right)\text{Cos}\left[1000\,t^3\right]\right)$