Introduction to Mathematica

#CA1

#Q1

Signals & Systems

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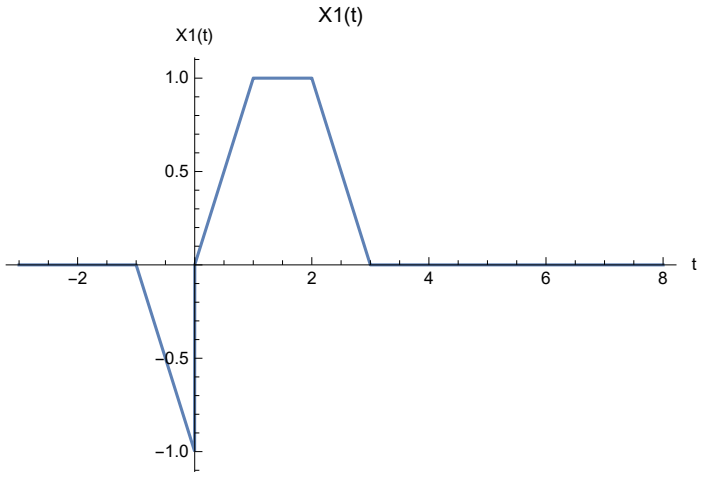
```
In[•]:= X1[x_] := { 0 - Ramp[x + 1] + UnitStep[x] + 2 Ramp[x] - Ramp[x - 1] - Ramp[x - 2] + Ramp[x - 3]   -
        X2[x_] := { 0 + UnitStep[x + 2] - 2 UnitStep[x + 1] +                    -3 ≤ x ≤ 8
                    Ramp[x] + UnitStep[x - 1] - Ramp[x - 1] - UnitStep[x - 2]
```

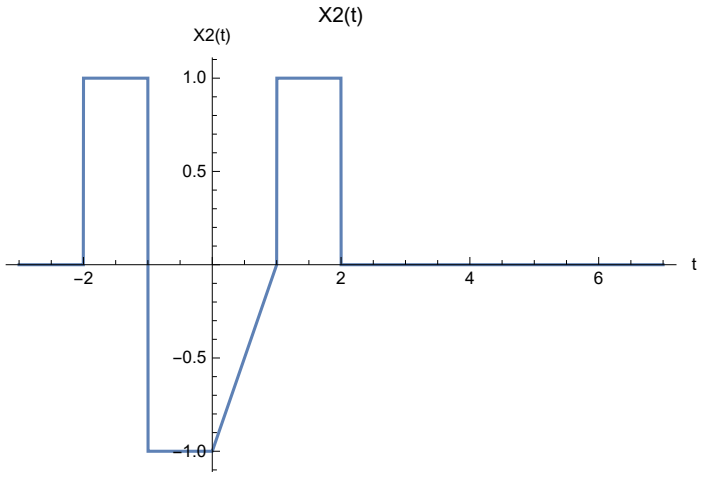
```
In[•]:= Plot[X1[x], {x, -3, 8}, PlotLabel → "X1(t)", AxesLabel → {"t", "X1(t)"}]
```

Out[•]=



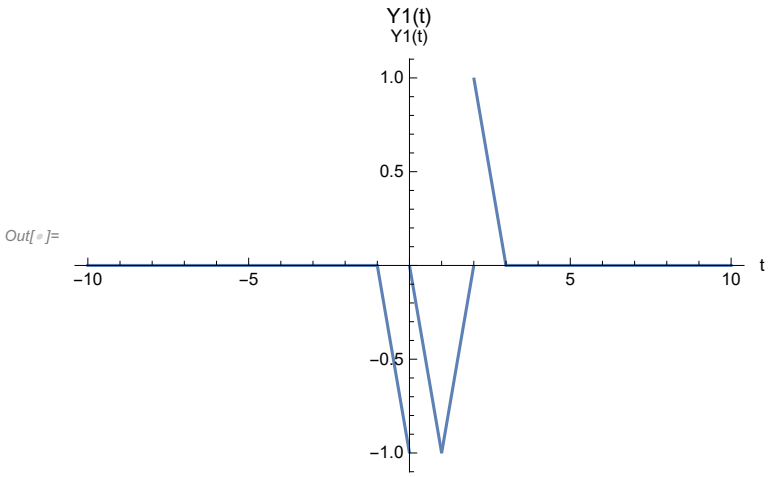

```
In[•]:= Plot[X2[x], {x, -3, 7}, PlotLabel → "X2(t)", AxesLabel → {"t", "X2(t)"}]
```

Out[•]=



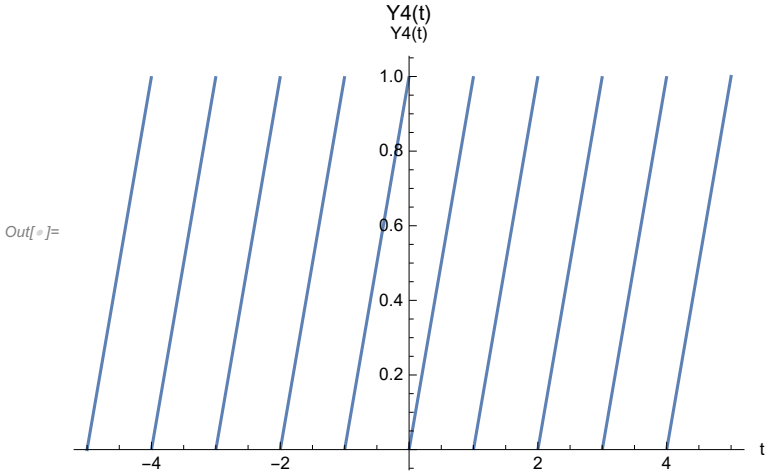
In[ ]:=
```
Y1[x_] := X1[x] * X2[x - 1]
Plot[Y1[x], {x, -10, 10}, PlotLabel → "Y1(t)", AxesLabel → {"t", "Y1(t)"}]
```

Out[ ]=



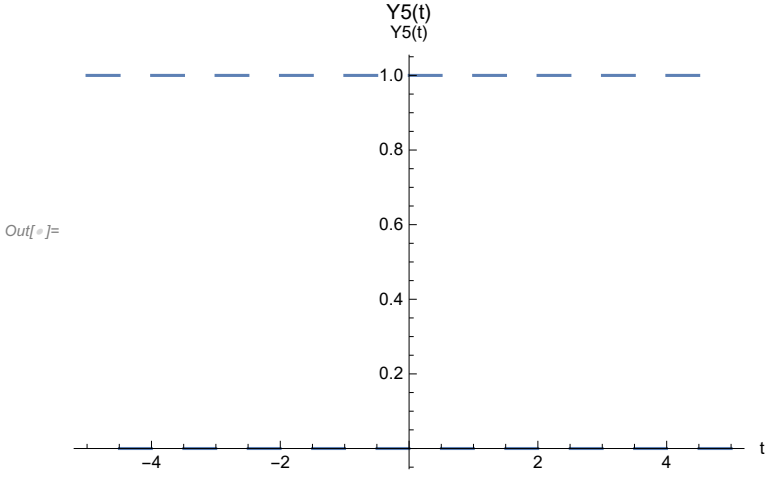
In[ ]:=
```
Y4[x_] := Sum[X1[x - 2 * k] * X2[-1 - x + 2 * k], {k, -5, 5}]
Plot[Y4[x], {x, -5, 5}, PlotLabel → "Y4(t)", AxesLabel → {"t", "Y4(t)"}]
```

Out[ ]=



In[ ]:=
```
Y5[x_] := UnitStep[Y4[x] + 1 / 2] - UnitStep[Y4[x] - 1 / 2]
Plot[Y5[x], {x, -5, 5}, PlotLabel → "Y5(t)", AxesLabel → {"t", "Y5(t)"}]
```

Out[ ]=



In[•]:=
```
Y6[x_] := Ramp[Y4[x] + 1] - 2 Ramp[Y4[x]] + Ramp[Y4[x] - 1]
Plot[Y6[x], {x, -5, 5}, PlotLabel → "Y6(t)", AxesLabel → {"t", "Y6(t)"}]
```

Out[•]=