Principles of Communication Systems Lab
Lab 1 - August 18th, 2017

IMT2015524

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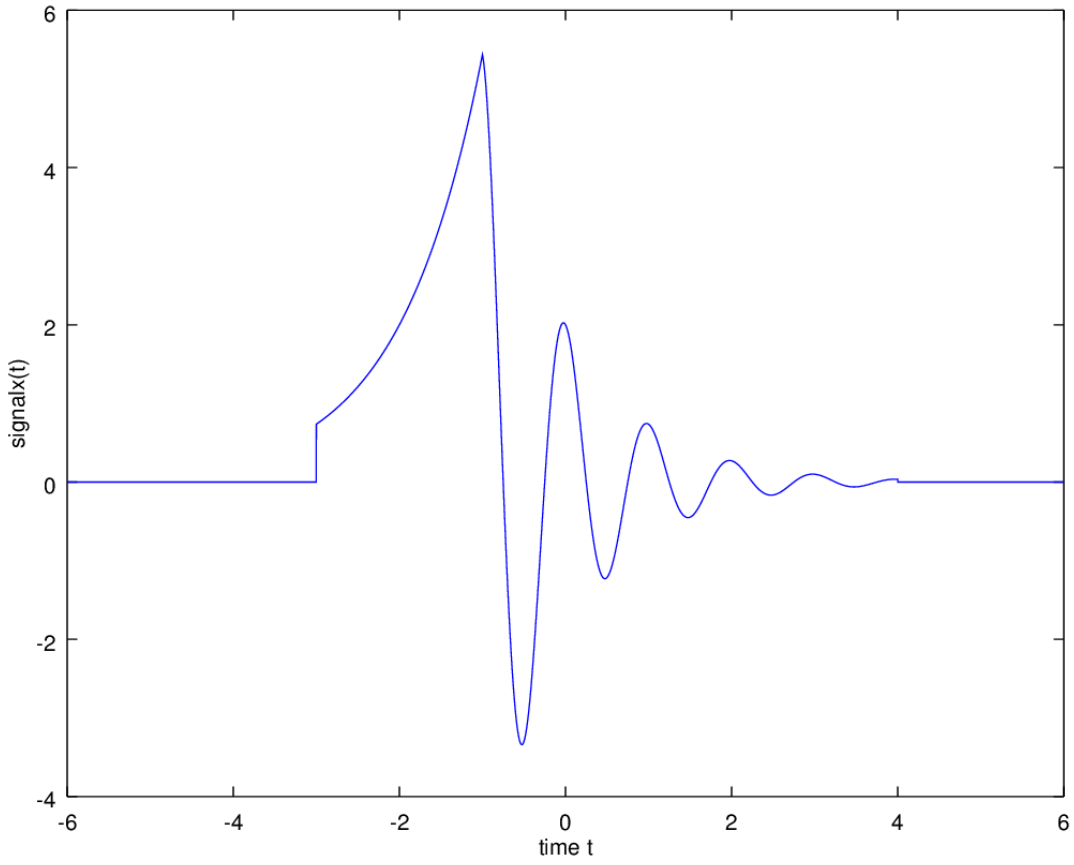
1. Signal x

A ; signalx

```
function retval = signalx (x)
  if -3 <= x & x <= -1
    retval = 2*exp(x+2);
  elseif -1 <= x & x <= 4
    retval = 2*exp(-1*x)*cos(2*pi*x);
  else
    retval = 0;
  end
end
```

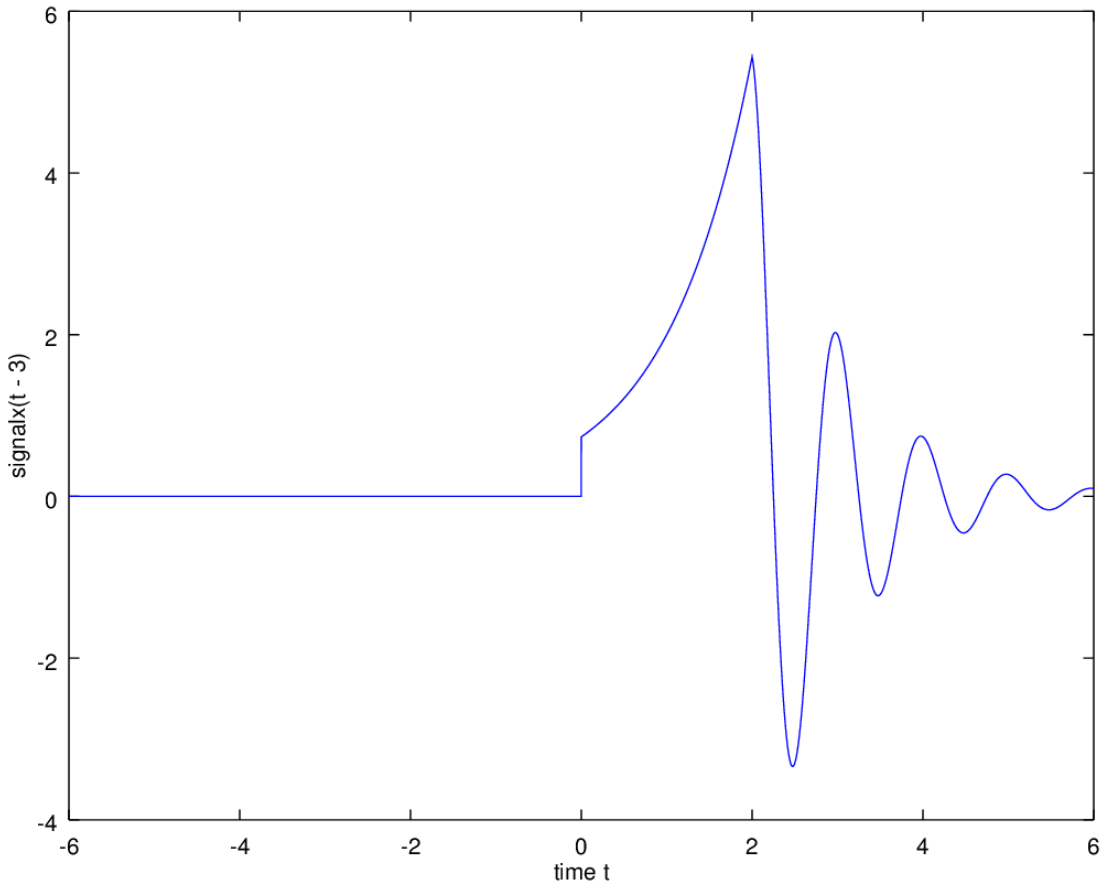
B ; -6 : 6

```
t = -6:0.001:6;
plot(t, arrayfun(@signalx, t));
```



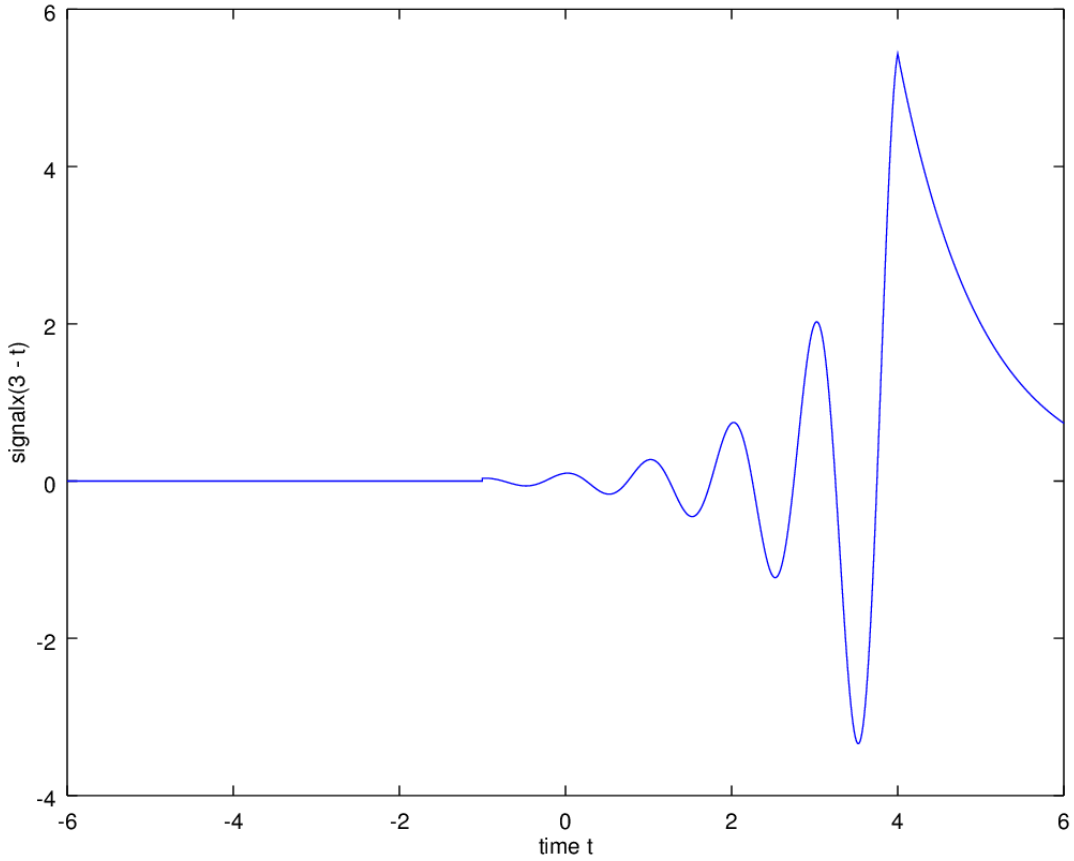
C ; t - 3

```
t = -6:0.001:6;
plot(t, arrayfun(@signalx, t - 3));
xlabel ("time t");
ylabel ("signalx(t - 3)");
```



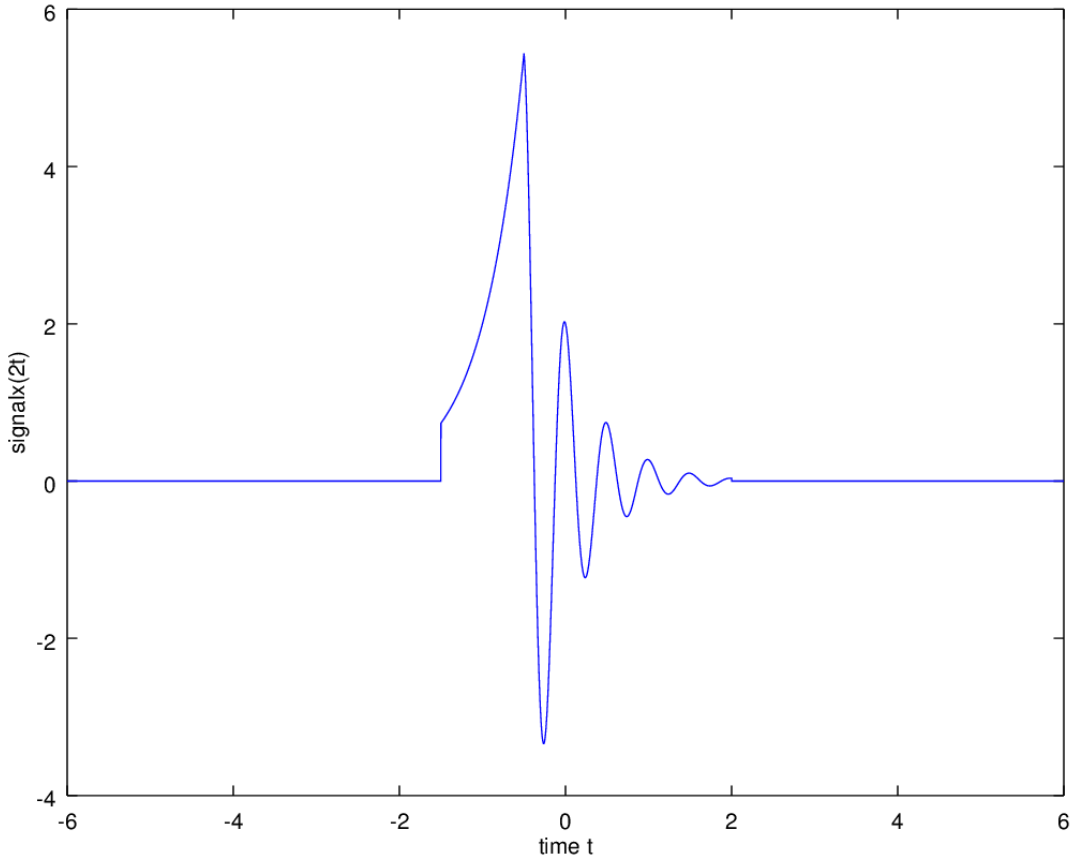
D ; 3 - t

```
t = -6:0.001:6;
plot(t, arrayfun(@signalx, 3 - t));
xlabel ("time t");
ylabel ("signalx(3 - t)");
```



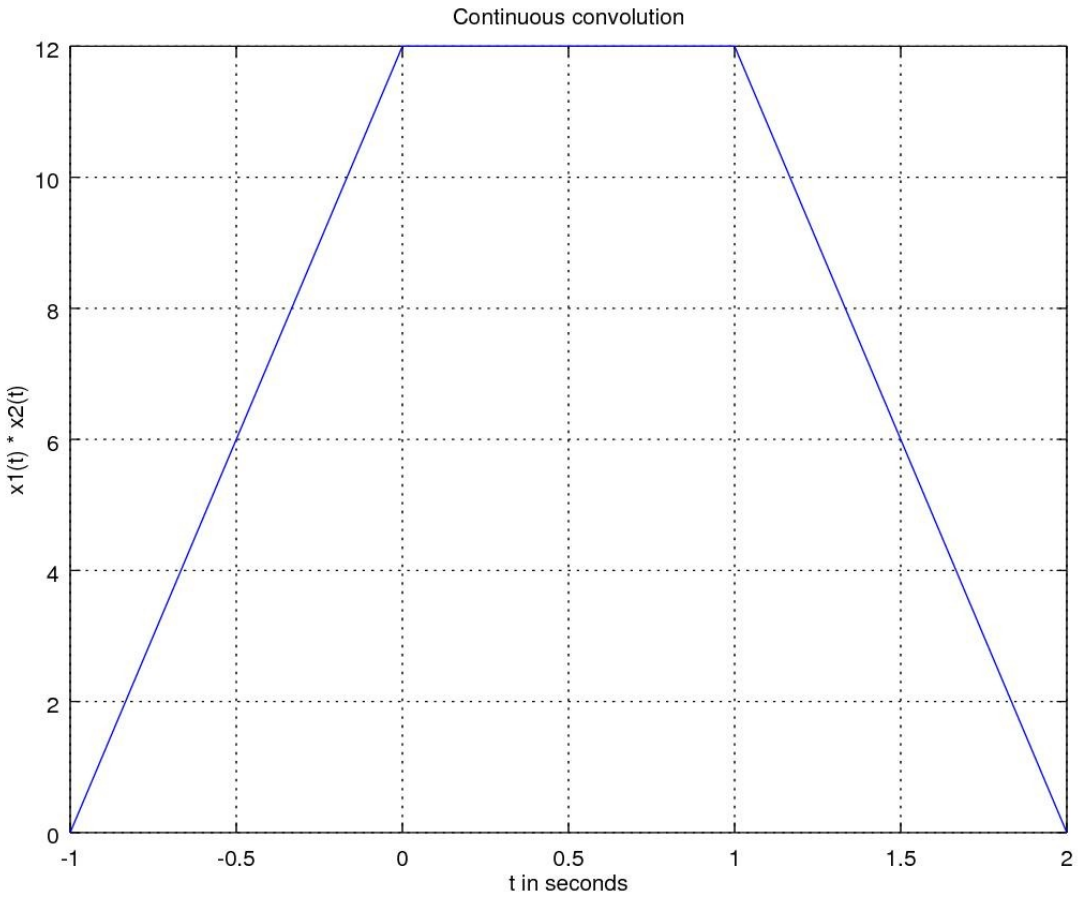
E ; 2t

```
t = -6:0.001:6;
plot(t, arrayfun(@signalx,  2*t));
xlabel ("time t");
ylabel ("signalx(2t)");
```



2. contconv

```
function [y,t] = contconv(x1,x2,s1,s2,dt)

 y=[];
 t=[];

 x1Initial=s1;
 x1Final=s1+(dt*length(x1))-dt;

 x2Initial=s2;
 x2Final=s2+(dt*length(x2))-dt;

 Ni=x1Initial+x2Initial;
 Nf=x1Final+x2Final;

 i=1;

 S1=x1Initial:dt:x1Final;
 S2=x2Initial:dt:x2Final;
 for n=Ni:dt:Nf

  ans=0;
  Temp=S2*(-1);
  Temp=Temp+n;
  HT=0;
  WT=0;

  for k=x1Initial:dt:x1Final

   i1=indexx(k,S1);
   i2=indexx(k,Temp);

   if i1 == 0 | i2 == 0
    ans=ans+0;
   else
    WT=WT+dt;
    HT=x1(i1)*x2(i2);
   end

  end

  WT=WT-dt;

  if(WT<0)
   WT=0;
  end

  ans=HT*WT;
  y(i)=ans;
  t(i)=n;
  i=i+1;

 end;

end;
```


Continuous convolution
x1(t) * x2(t)
t in seconds
12
10
8
6
4
2
0
-1
-0.5
0
0.5
1
1.5
2