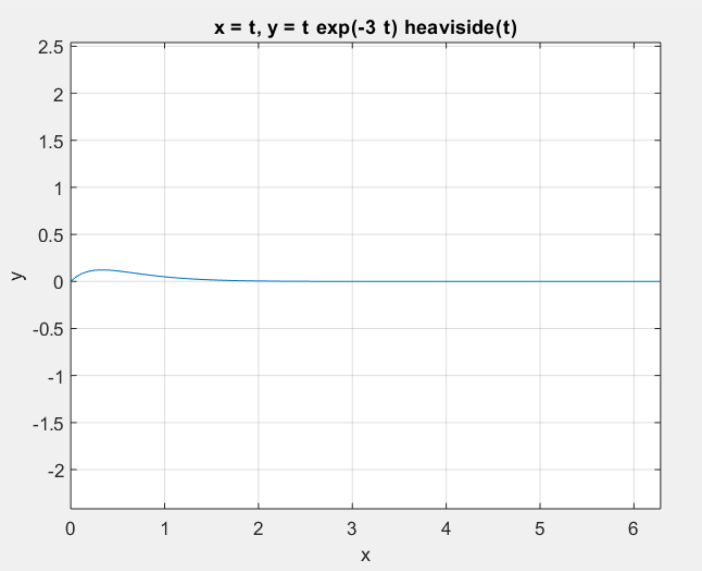
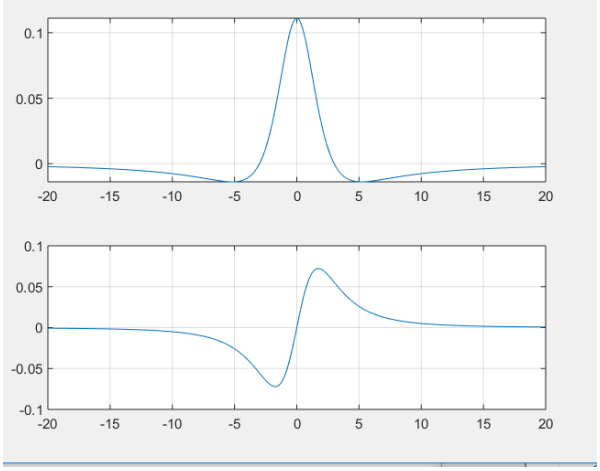
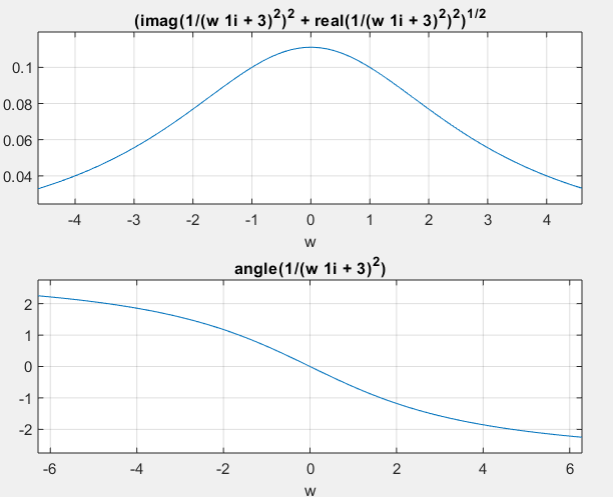
Exercice 1 :

```
%Exercice 1

%f(t)=t*exp(-3*t)

syms t
f=t*exp(-3*t)*heaviside(t)

figure(1)
ezplot(t,f),grid %Le "ez" permet d'afficher la courbe sans avoir
l'intervalle t

%transformé de Fourier X(w)de f(t)
X1=fourier(f)

% Partie réel de X(w)
Xr1= int(f*cos(w*t),-inf,inf);
Xr2=real(X1);
%Comparaison
e1=Xr1-Xr2;

% Partie imaginaire de X(w)
Xi1= int(f*sin(w*t),-inf,inf);
Xi2=imag(X1);
%Comparaison
e2=Xi1-Xi2;

figure(2)
w=-20:0.1:20;
subplot (211)
plot(w,Xr1),grid
subplot (212)
plot(w,Xi1),grid

%Spectre d'amplitude :
SA1=sqrt((Xr2^2)+(Xi2^2))
SA2=abs(X1)
%Comparaison
e3=SA1-SA2

%Spectre de phase :
phase=Xi1/Xi2
SP1=atan(phase)
SP2=angle(X1)
e4=SP1-SP2
```

```
figure(3)
subplot(211)
ezplot(SA1),grid
subplot(212)
ezplot(SP2),grid
```







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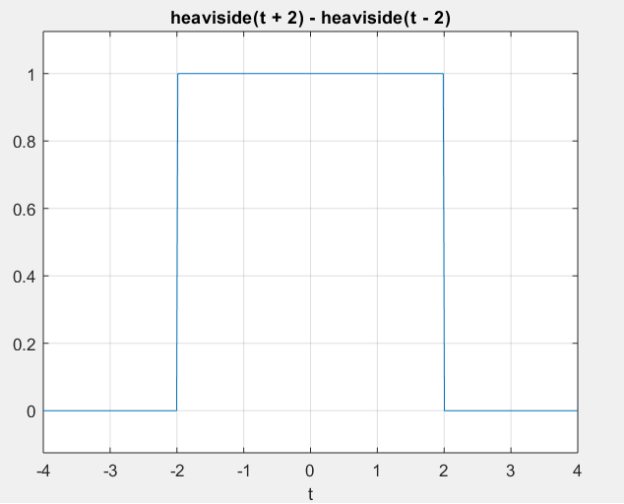
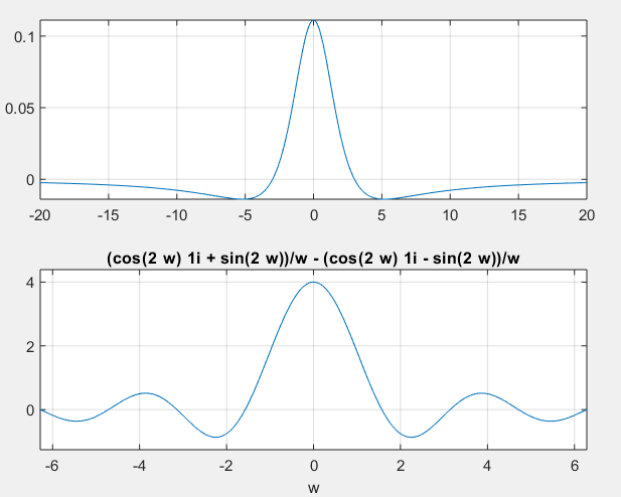
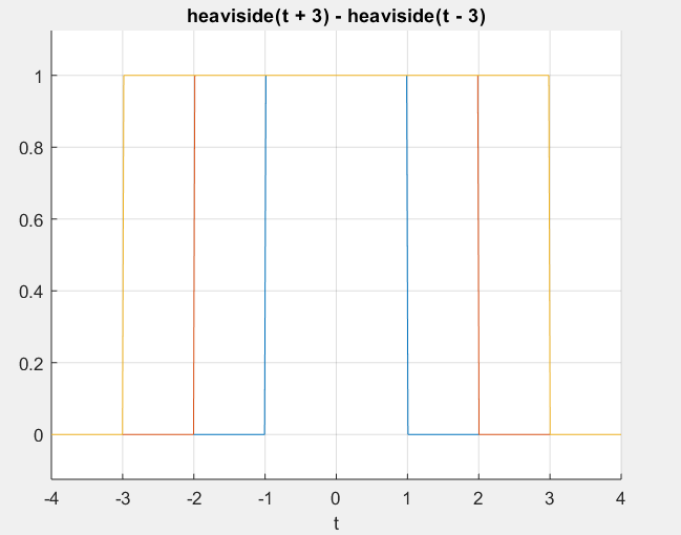
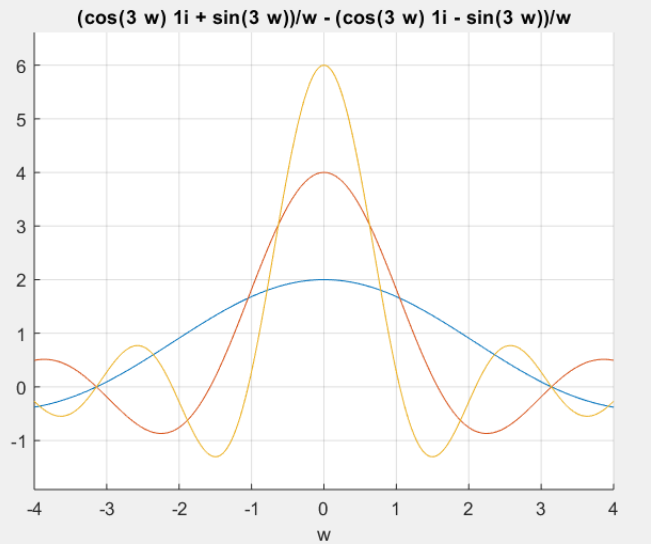
```
clc
close
clear all

%f(t)= 1 si abs(t)<= T/2 et 0 ailleurs, T=4 dans notre cas, donc
T/2 = 2
syms t
T=2
f1= 1*heaviside(t+T) % Retardé de T/2
f2= 1*heaviside(t-T) % Avancé de T/2
f=f1-f2
figure(1)
ezplot(f,[-4,4]),grid

%Transformée de Fourier
syms t w
X=fourier(f);

figure(2)
ezplot(X),grid;

% T=1
T1=1
f1= 1*heaviside(t+T1)
f2= 1*heaviside(t-T1)
fa=f1-f2
X1=fourier(fa)

% T=2
T2=2
f1= 1*heaviside(t+T2)
f2= 1*heaviside(t-T2)
fb=f1-f2
X2=fourier(fb)

% T=3
T3=3
f1= 1*heaviside(t+T3)
f2= 1*heaviside(t-T3)
fc=f1-f2
X3=fourier(fc)
```

```
figure(3)
hold on
ezplot(fa,[-4,4]),grid
ezplot(fb,[-4,4]),grid
ezplot(fc,[-4,4]),grid

figure(4)
hold on
ezplot(X1,[-4,4]),grid
ezplot(X2,[-4,4]),grid
ezplot(X3,[-4,4]),grid

%Parceval
P=(1/2*pi)*int(abs(X)^2,-inf,inf)
```









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