

Σήματα και Συστήματα 2019 – Εργαστήριο
Εφαρμογή 2
Λάμπρος Γραμματικόπουλος , ΑΜ: 2022201800038

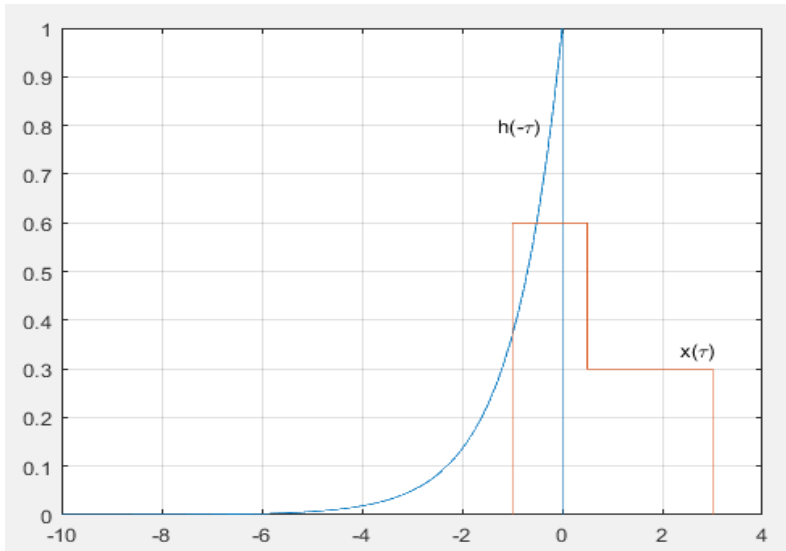
Ερώτημα 1ο

```
%dhmiourgia kai ectupwsh tw'n sunarthsewn h(t) kai x(t)
format compact
time1 = linspace(0,10,1001);
h1 = exp(-time1);
h = [0 h1];
time = [0 time1];           %used for h(t)
timex = [-1 -1 0.5 0.5 3 3]; %used for x(t)
x = [0 0.6 0.6 0.3 0.3 0];
figure(1);
plot(time,h,timex,x);
grid;
xlabel('\tau');
axis([-5 10 0 1]);
title('kroustikh apokrish kai shma eisodou');
gtext('x(\tau)');
gtext('h(\tau)');
```



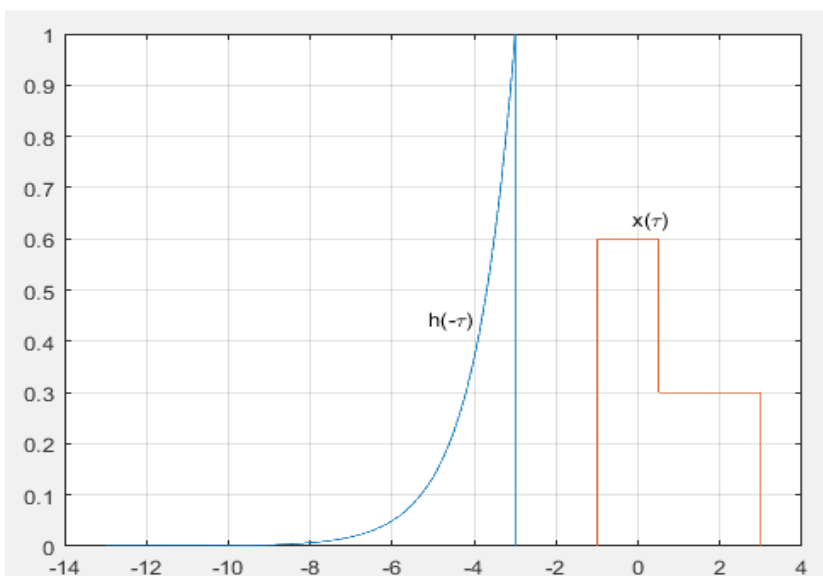
Ερώτημα 2ο

```
%anastrofh  
figure(2);  
plot(-time,h,time,x);  
grid;  
xlabel('\tau');  
gtext('x(\tau)');  
gtext('h(-\tau)');
```



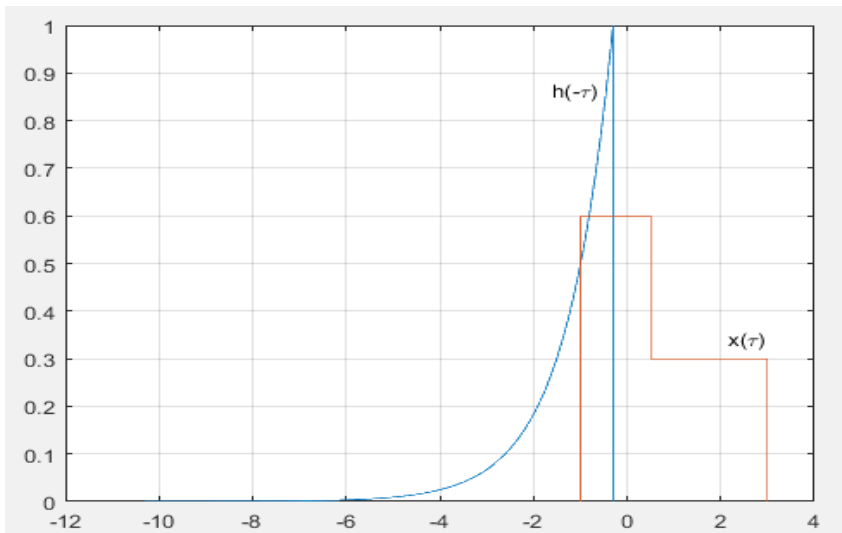
Ερώτημα 3ο

```
%metakinshsh kata 3 (t=-3) pros ta aristera (den uparxei epikalupsh)  
t=-3;  
figure(3);  
plot(-time+t,h,time,x);  
grid;  
xlabel('\tau');  
gtext('x(\tau)');  
gtext('h(-\tau)');
```



Ερώτημα 4ο

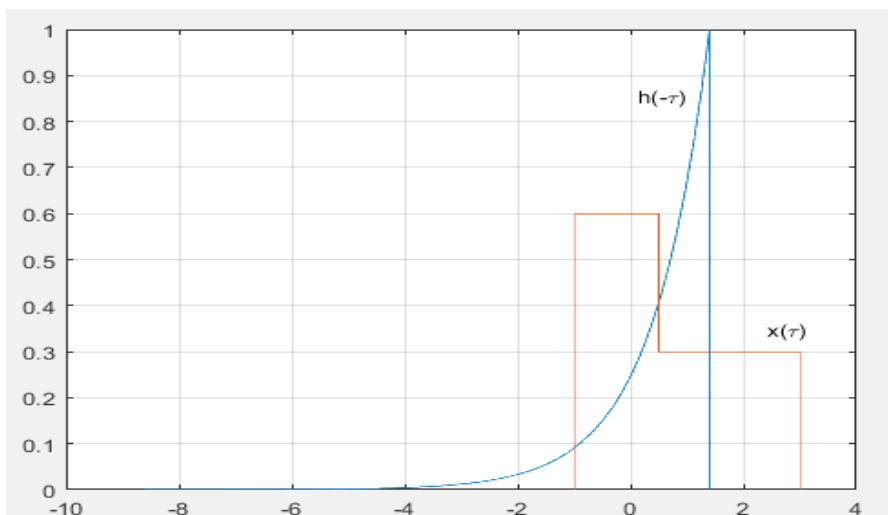
```
%metakinshh kata -0.3 (den exoume epikalupsh me to proto tmhma ths x(t))  
t=-0.3;  
figure(4);  
plot(-time+t,h,timex,x);  
grid;  
xlabel('\tau');  
gtext('x(\tau)');  
gtext('h(-\tau)');
```



Ερώτημα 5ο

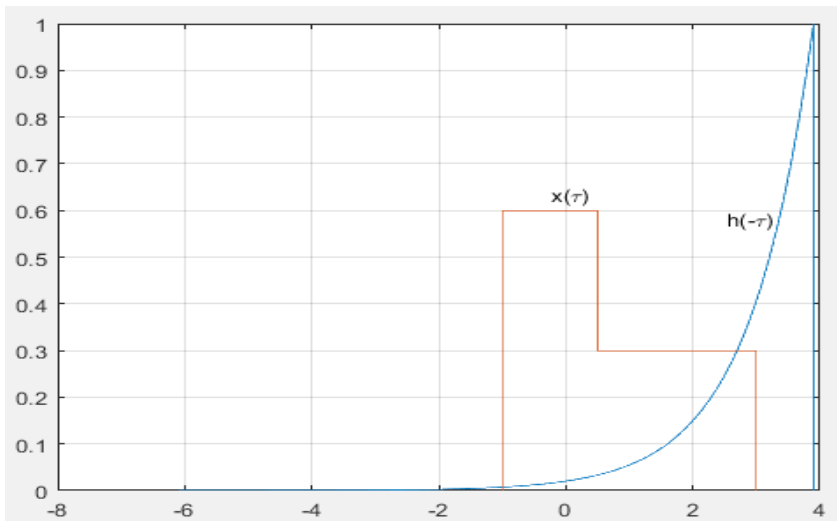
%metakinshh kata 1.4 (exoume plhrh epikalupsh me to proto tmhma ths x(t) kai merikh me to deuterio)

```
t=1.4;  
figure(5);  
plot(-time+t,h,timex,x);  
grid;  
xlabel('\tau');  
gtext('x(\tau)');  
gtext('h(-\tau)');
```



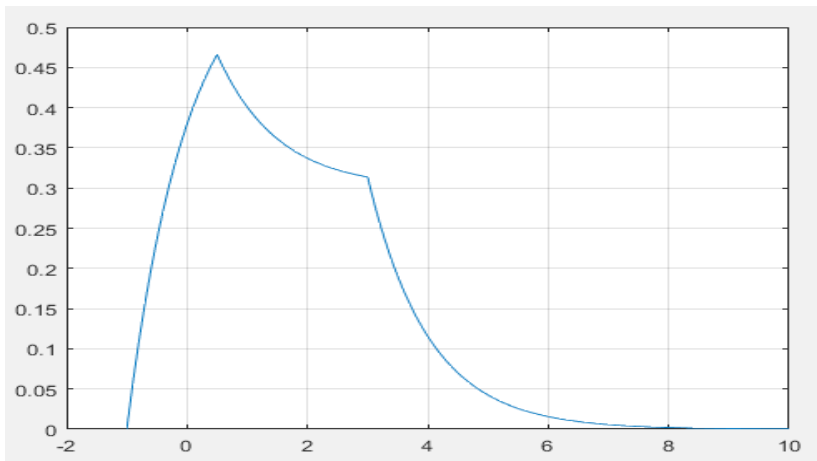
Ερώτημα 6ο

```
%metakinsh kata 3.9 (exoume plhrh epikalupsh kai me ta duo tmhmata ths x(t))
t=3.9;
figure(6);
plot(-time+t,h,timex,x);
grid;
xlabel('\tau');
gtext('x(\tau)');
gtext('h(-\tau)');
```



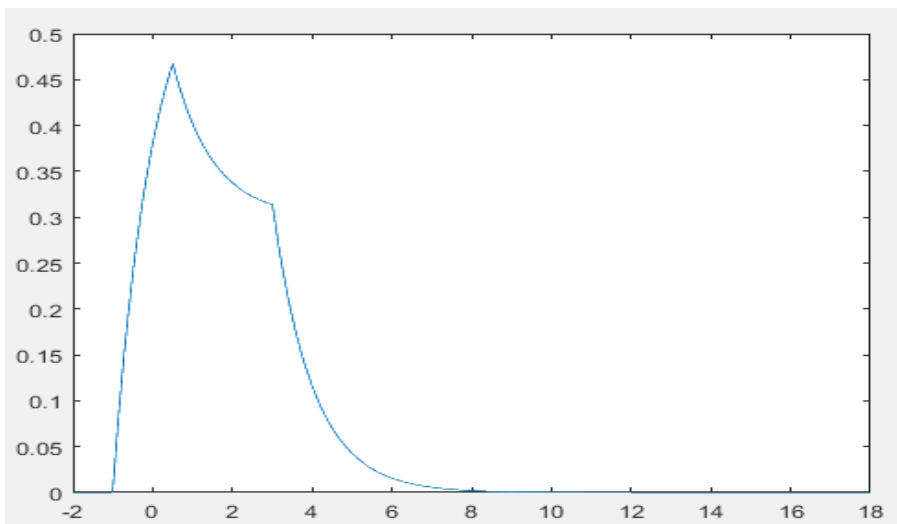
Ερώτημα 7ο

```
%sunarthsh tou apotelesmatos ths sunelikshs, dhladh ths eksodou y(t) tou susthmatos
%proto tmhma , -1=<t=<0.5
t1=-1:0.1:0.5;
y1=0.6*(1-exp(-1-t1));
%deutero tmhma , 0.5=<t=<3
t2=0.5:0.1:3;
y2=0.3*exp(-t2).*(exp(t2)-2*exp(-1)+exp(0.5));
%trito tmhma , 3=<t=<10
t3=3:0.1:10;
y3=0.3*exp(-t3)*(exp(0.5)-2*exp(-1)+exp(3));
%sunenwsh dianusmatwn xronou
t=[t1 t2 t3];
%sunenwsh dianusmatwn synarthshs y(t)
y=[y1 y2 y3];
figure(7);
plot(t,y);
grid;
```



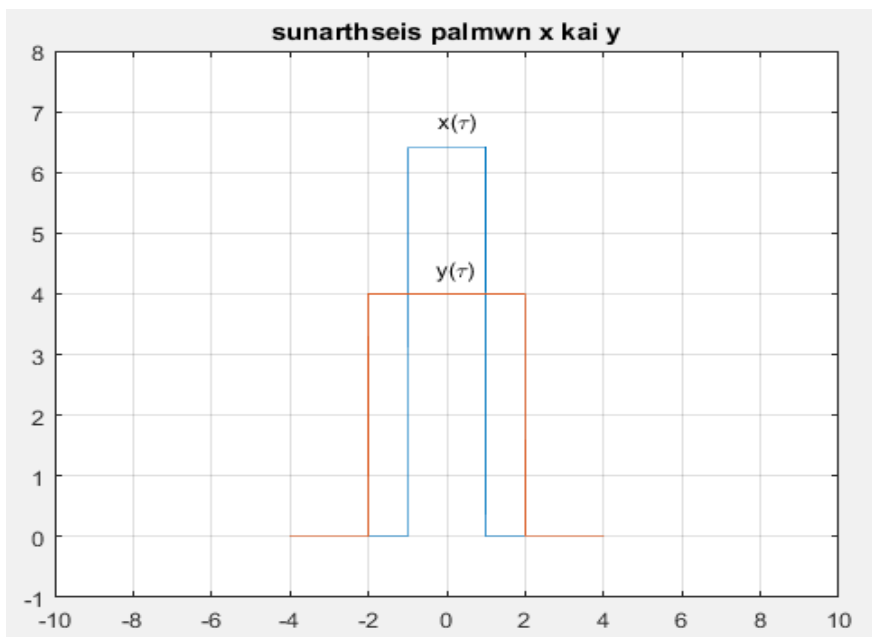
Ερώτημα 8ο

```
%entolh conv
tt1=-1:0.01:0.5;
tt2=0.5+0.01:0.01:3;
tt3=3+0.01:0.01:9;
xx=[0.6*ones(size(tt1)) 0.3*ones(size(tt2)) zeros(size(tt3))];
hh=exp(-[tt1 tt2 tt3]).*heaviside([tt1 tt2 tt3]);
yy=conv(xx,hh)*0.01;
figure(8);
plot(-2:0.01:18, yy);
```

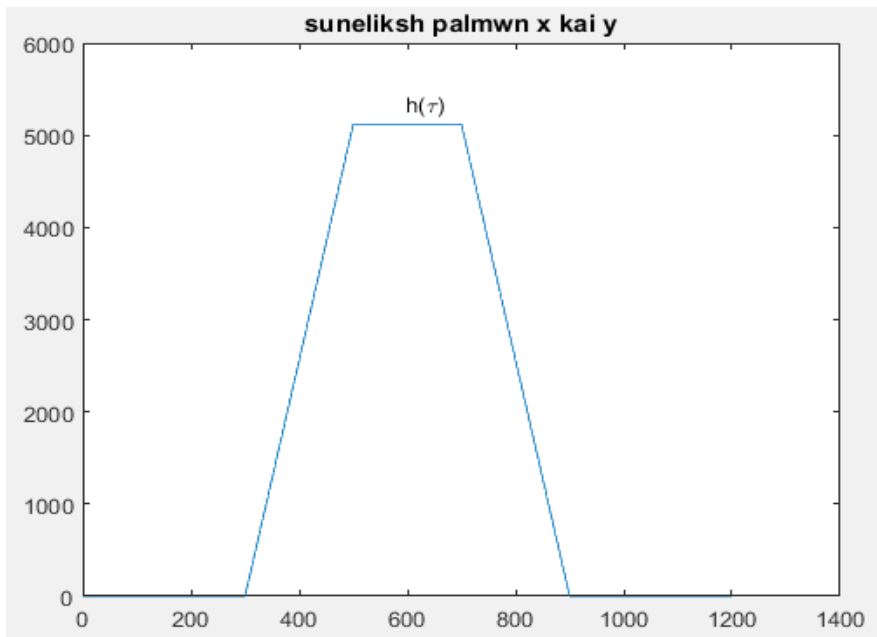


Ερώτημα 9ο

```
tx=-2:0.01:2;  
ty=-4:0.01:4;  
x=0.8*8*rectpuls(tx,2);  
y=0.5*8*rectpuls(ty,4);  
figure(1);  
plot(tx,x,ty,y);  
grid;  
xlabel('\tau');  
axis([-10 10 -1 8]);  
title('sunarthseis palmwn x kai y');  
gtext('x(\tau)');  
gtext('y(\tau)');
```



```
figure(2);
plot(conv(x,y));
xlabel('\tau');
title('suneliksh palmwn x kai y');
gtext('h(\tau)');
```



```
E1=trapz(x)
E2=trapz(y)
E3=E1*E2
```

```
>> E1=trapz(x)
E2=trapz(y)
E3=E1*E2

E1 =

    1.2800e+03

E2 =
|
|    1600

E3 =

    2.0480e+06
```

```
E4=trapz(conv(x,y))
```

```
>> E4=trapz(conv(x,y))

E4 =

    2.0480e+06
```

Άρα τα αποτελέσματα των τελευταίων δύο υπολογισμών συμφωνούν.