Exemple 4 :

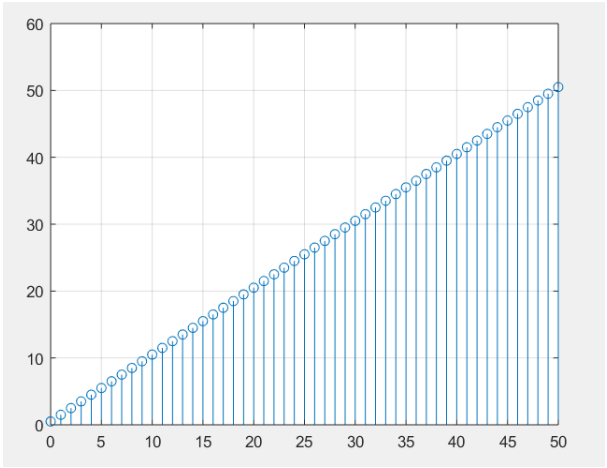
```
clear
close all
%DES

%Rechercher les pôles

syms z
x=(z^2+3*z+1)/(z^3+5*z^2+2*z-8);
D=[1 5 2 -8]
r0=roots(D)
%Cacul des coeff
C1=limit((z-r0(1))*x,z,r0(1))
C2=limit((z-r0(2))*x,z,r0(2))
C3=limit((z-r0(3))*x,z,r0(3))

%Recherche des pôles
Den=[1 0 -3 2]
p=roots(Den)

syms z
x=(z^2-3*z+1)/(z^3-3*z+2);
C1 = limit((z-p(1))*x,z,p(1))
%Pour le pôle multiple p2=1 on a m=2
m=2
f=(z-1)^m*x;
di=diff(f,z,m-1)
fact=1/factorial(m-1)
C2=limit(fact*di,z,1)
%Pour le calcul de C3
di=diff(f,z,m-2)
fact=1/factorial(m-2)
C3=limit(fact*di,z,1)

%Commande "residuez"
Num=[1 -8 17 2 -24]
Den=[1 1 -2]
[R, P, K]=residuez(Num,Den)
```

Exemple 5 :

```
clear
close all
%Résolution d'équation
syms n z Y
X=ztrans(0.9^n,z);
Y1=z^(-1)*Y
Y2=z^(-2)*Y
G=Y+0.5*Y1+2*Y2-X;
SOL=solve(G,Y);
pretty(SOL);
y=iztrans(SOL,n);
```

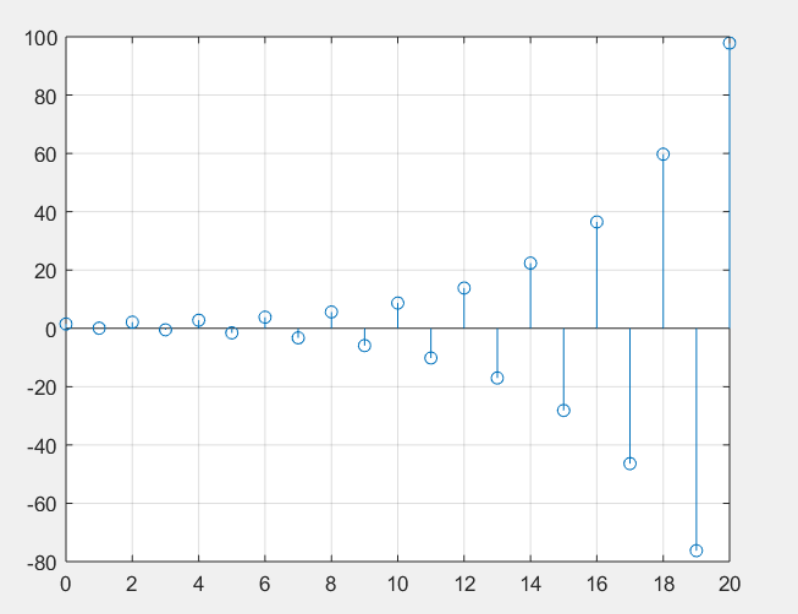
Exercice 1 :

```
clear
close all
%Exercice 1
syms n z Y
X=ztrans(heaviside(n),z);
Y1=z^(-1)*Y;
G=Y-Y1-X;
SOL=solve(G,Y);
pretty(SOL);
y=iztrans(SOL,n);

%Représentation
k=0:1:50
y1=subs(y,k)
figure(1)
stem(k,y1),grid;%Correspond à plot mais pour le système échantillonnés
```



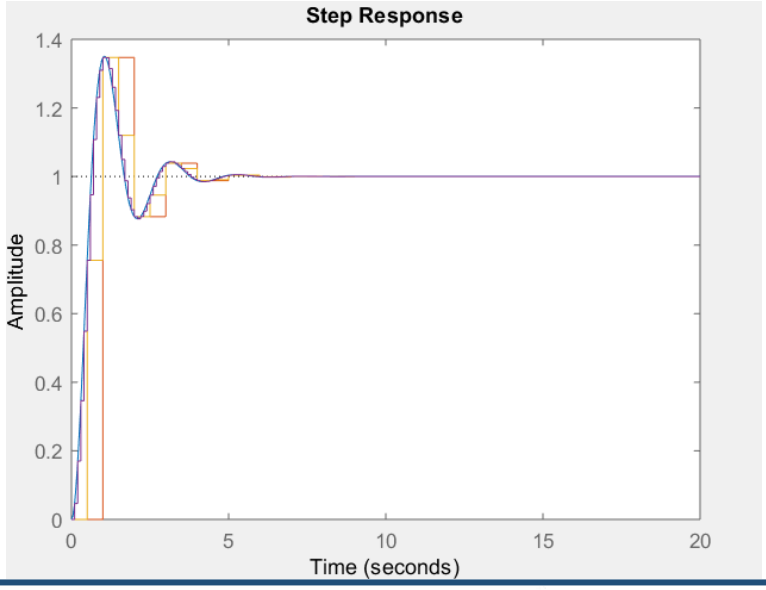
Exercice 2 :

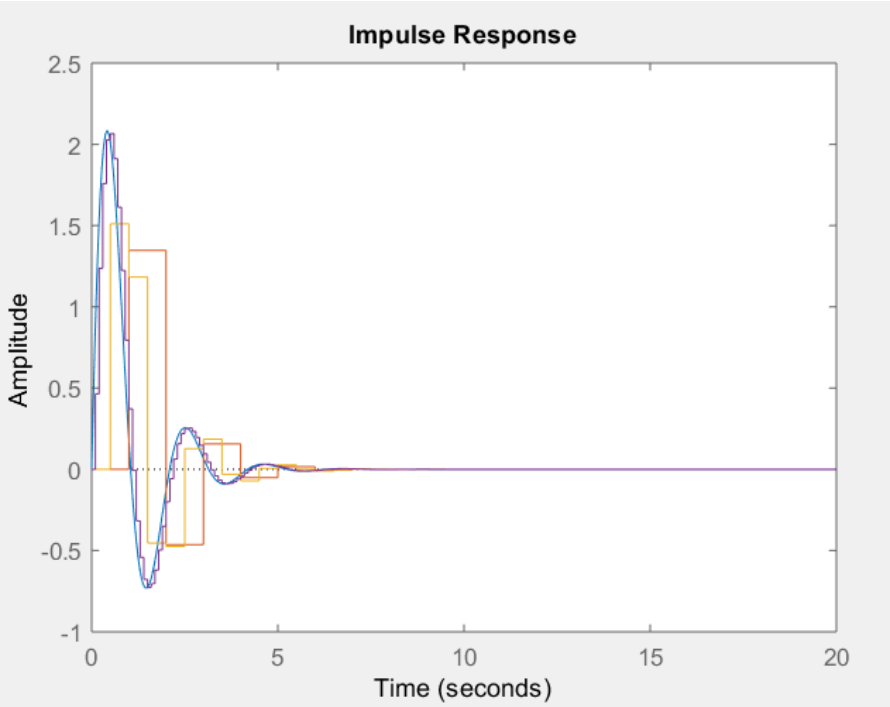
```
clear
close all
%Exercice 2
syms n z Y
X=ztrans(0.8^n,z);
X1=z^(-1)*Y
Y1=z^(-1)*Y;
Y2=z^(-2)*Y;
G=Y+1.5*Y1-+0.5-Y2-X-X1;
SOL=solve(G,Y);
pretty(SOL);
y=iztrans(SOL,n);

%Représentation
k=0:1:20
y1=subs(y,k)
figure(1)
stem(k,y1),grid;
```



Exercice 3 :

```
clear
close all
%Exercice 3
num=10
den=[1 2 10]
GC=tf(num,den)
te1=1
GC1=c2d(GC,te1,'zoh');
te2=0.5
GC2=c2d(GC,te2,'zoh');
te3=0.1
GC3=c2d(GC,te3,'zoh');

figure(1)
step(GC)
hold on
step(GC1)
hold on
step(GC2)
hold on
step(GC3)

figure(2)
impulse(GC)
hold on
impulse(GC1)
hold on
impulse(GC2)
hold on
impulse(GC3)
```




Impulse Response
Amplitude
Time (seconds)
2.5
2
1.5
1
0.5
0
-0.5
-1
0
5
10
15
20