```
% PES1UG20EC083 Jacob V Sanoj
% CS Q.1
clc;
clear ;
close all;

ng11= [1 -1 2];
dg11= [1 2 1];
%k=1
nf=[0 0 1];
df=[0 0 1];
[num11,den11]=feedback(ng11,dg11,nf,df);
figure
subplot(221)
step(num11,den11)
title('Step response of G1(s)')
xlabel('t')
ylabel('y1(t)')

G1=tf(num11,den11)
```

```
G1 =

   s^2 - s + 2
  -------------
  2 s^2 + s + 3

Continuous-time transfer function.
```

```
pole(G1)
```

```
ans = 2×1 complex
  -0.2500 + 1.1990i
  -0.2500 - 1.1990i
```

```
%zero(G1)

%k=2
ng12= [2 -2 4];
dg12= [1 2 1];

[num12,den12]=feedback(ng12,dg12,nf,df);

subplot(222)
step(num12,den12)
title('Step response of G1(s)')
xlabel('t')
ylabel('y2(t)')

G2=tf(num12,den12)
```

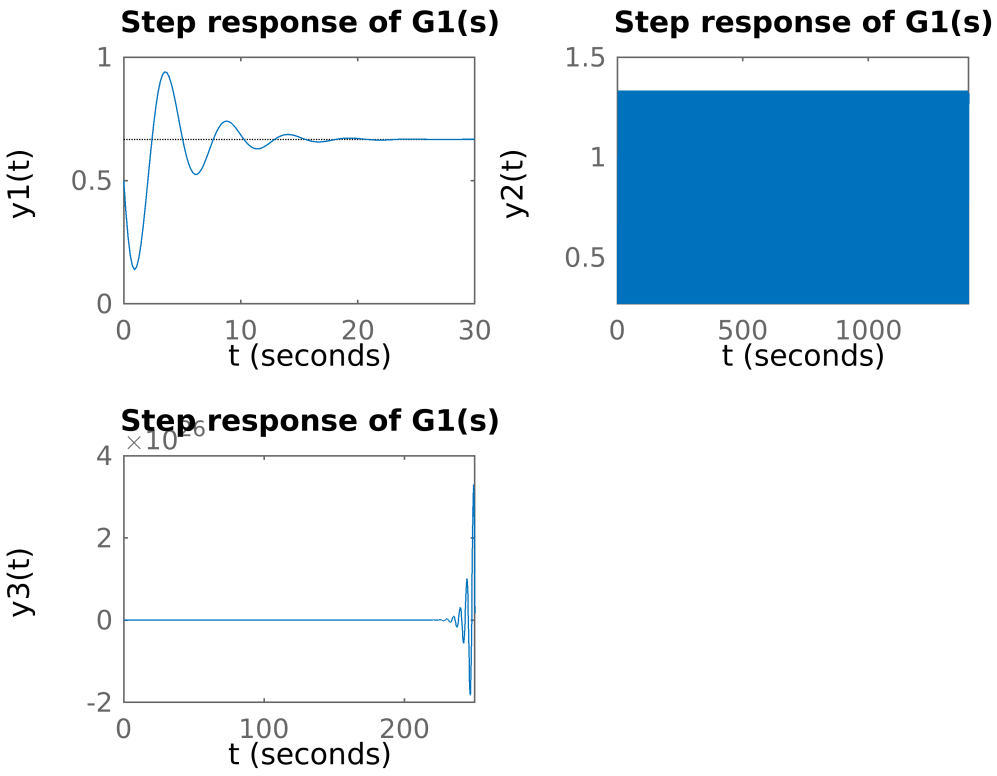
```
G2 =

  2 s^2 - 2 s + 4
  ---------------
```

```
     3 s^2 + 5

Continuous-time transfer function.
```

```
pole(G2)
```

```
ans = 2×1 complex
   0.0000 + 1.2910i
   0.0000 - 1.2910i
```

```
%zero(G2)

%k=5
ng13= [5 -5 10];
dg13= [1 2 1];

nf=[0 0 1];
df=[0 0 1];
[num13,den13]=feedback(ng13,dg13,nf,df);

subplot(223)
step(num13,den13)
title('Step response of G1(s)')
xlabel('t')
ylabel('y3(t)')
```




```
G3=tf(num13,den13)
```

```
G3 =

  5 s^2 - 5 s + 10
  ----------------
  6 s^2 - 3 s + 11

Continuous-time transfer function.
```

```
pole(G3)
```

```
ans = 2×1 complex
   0.2500 + 1.3307i
   0.2500 - 1.3307i
```

```
%zero(G3)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

ng21= [0 0 0 1];
dg21= [1 2 4 0];

nf=[0 0 1];
df=[0 0 1];
[num21,den21]=feedback(ng21,dg21,nf,df);
figure
subplot(221)
step(num21,den21)
title('Step response of G2(s)')
xlabel('t')
ylabel('y1(t)')

G4=tf(num21,den21)
```

```
G4 =

            1
  ---------------------
  s^3 + 2 s^2 + 4 s + 1

Continuous-time transfer function.
```

```
pole(G4)
```

```
ans = 3×1 complex
  -0.8576 + 1.6661i
  -0.8576 - 1.6661i
  -0.2848 + 0.0000i
```

```
%zero(G4)

ng22= [0 0 0 4];
dg22= [1 2 4 0];

nf=[0 0 1];
df=[0 0 1];
[num22,den22]=feedback(ng22,dg22,nf,df);

subplot(222)
```

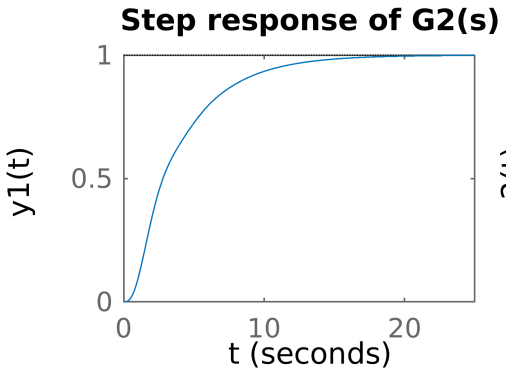
```
step(num22,den22)
title('Step response of G2(s)')
xlabel('t')
ylabel('y2(t)')

G5=tf(num22,den22)
```

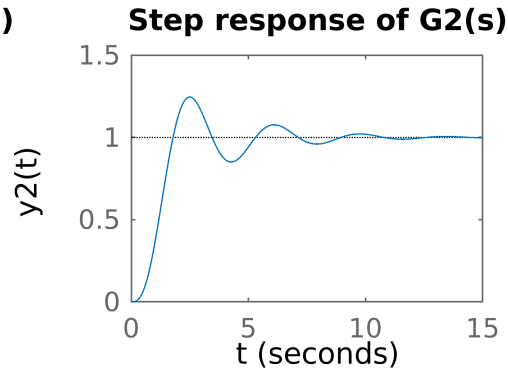
```
G5 =

           4
  ----------------------
  s^3 + 2 s^2 + 4 s + 4

Continuous-time transfer function.
```

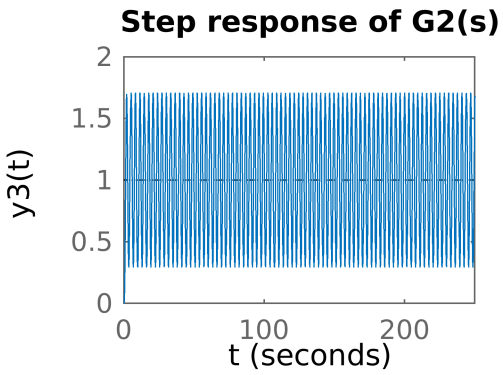
```
pole(G5)
```

```
ans = 3×1 complex
  -0.3522 + 1.7214i
  -0.3522 - 1.7214i
  -1.2956 + 0.0000i
```

```
%zero(G5)

ng23= [0 0 0 8];
dg23= [1 2 4 0];

nf=[0 0 1];
df=[0 0 1];
[num23,den23]=feedback(ng23,dg23,nf,df);

subplot(223)
step(num23,den23)
title('Step response of G2(s)')
xlabel('t')
ylabel('y3(t)')
```








```
G6=tf(num23,den23)
```

```
G6 =

           8
  ---------------------
  s^3 + 2 s^2 + 4 s + 8

Continuous-time transfer function.
```

```
pole(G6)
```

```
ans = 3×1 complex
  -2.0000 + 0.0000i
  -0.0000 + 2.0000i
  -0.0000 - 2.0000i
```

```
%zero(G6)
```