EGE UNIVERSITY
ELECTRICAL AND ELECTRONICS ENGINEERING

CONTROL SYSTEMS 1

LAB-2

MUSA OĞURAL
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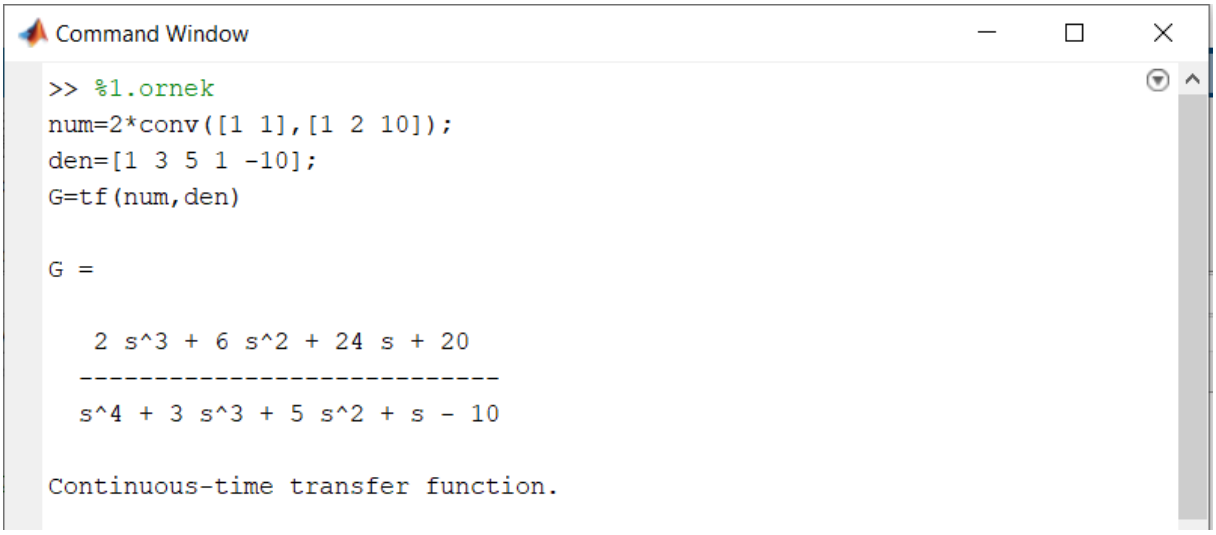
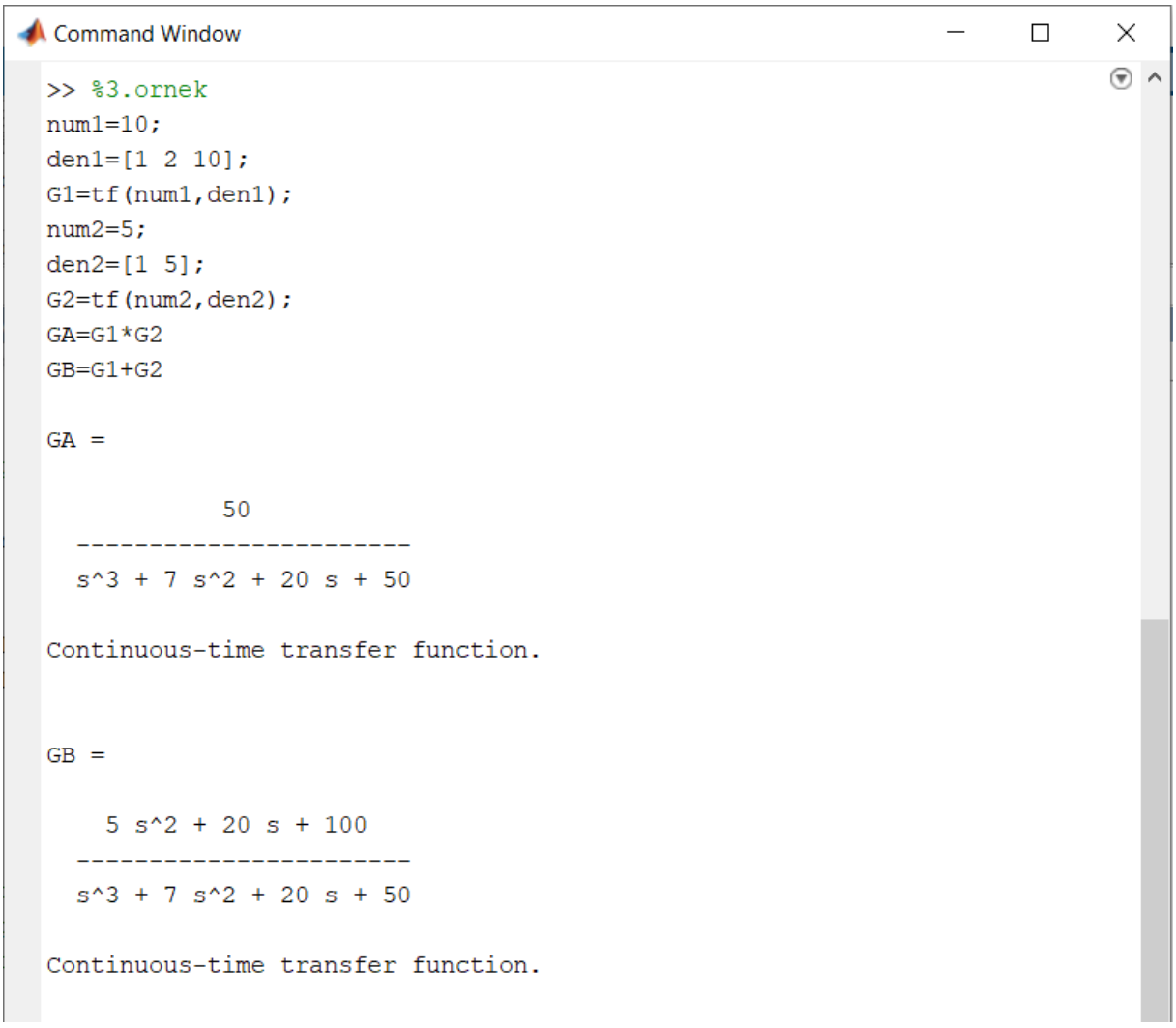
1.SORU



```
>> %1.ornek
num=2*conv([1 1],[1 2 10]);
den=[1 3 5 1 -10];
G=tf(num,den)

G =

   2 s^3 + 6 s^2 + 24 s + 20
  ---------------------------
  s^4 + 3 s^3 + 5 s^2 + s - 10

Continuous-time transfer function.
```

3.SORU



```
>> %3.ornek
num1=10;
den1=[1 2 10];
G1=tf(num1,den1);
num2=5;
den2=[1 5];
G2=tf(num2,den2);
GA=G1*G2
GB=G1+G2

GA =

           50
  ------------------------
  s^3 + 7 s^2 + 20 s + 50

Continuous-time transfer function.


GB =

    5 s^2 + 20 s + 100
  ------------------------
  s^3 + 7 s^2 + 20 s + 50

Continuous-time transfer function.
```

2.SORU

Command Window

```
>> %2.ornek
Z=zero(G)
P=pole(G)
R=roots(den) %transfer fonksiyonun kutupları vardır
damp(G)      %polinomun ise kökleri vardır
             %o yüzden R=roots(G) çalışmaz!

Z =

  -1.0000 + 3.0000i
  -1.0000 - 3.0000i
  -1.0000 + 0.0000i


P =

  -1.0000 + 2.0000i
  -1.0000 - 2.0000i
  -2.0000 + 0.0000i
   1.0000 + 0.0000i


R =

  -1.0000 + 2.0000i
  -1.0000 - 2.0000i
  -2.0000 + 0.0000i
   1.0000 + 0.0000i


        Pole              Damping       Frequency      Time Constant
                                     (rad/seconds)       (seconds)

   1.00e+00               -1.00e+00       1.00e+00       -1.00e+00
  -2.00e+00                1.00e+00       2.00e+00        5.00e-01
  -1.00e+00 + 2.00e+00i    4.47e-01       2.24e+00        1.00e+00
  -1.00e+00 - 2.00e+00i    4.47e-01       2.24e+00        1.00e+00
>> %3.ornek
```

4.SORU

Command Window

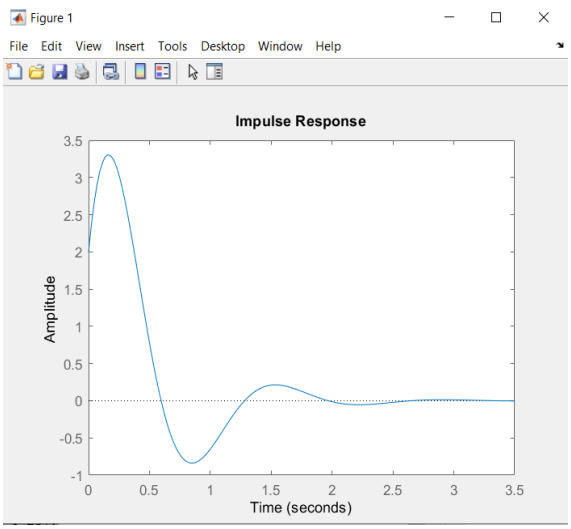
```
>> %4.ornek
num1=10;
den1=[1 2 10];
G=tf(num1,den1);
num2=5;
den2=[1 5];
H=tf(num2,den2);
% GCL=G/(1+G*H) da kullanılabilir!
GCL=feedback(G,H)

GCL =

         10 s + 50
  ------------------------
  s^3 + 7 s^2 + 20 s + 100

Continuous-time transfer function.
```

5.SORU

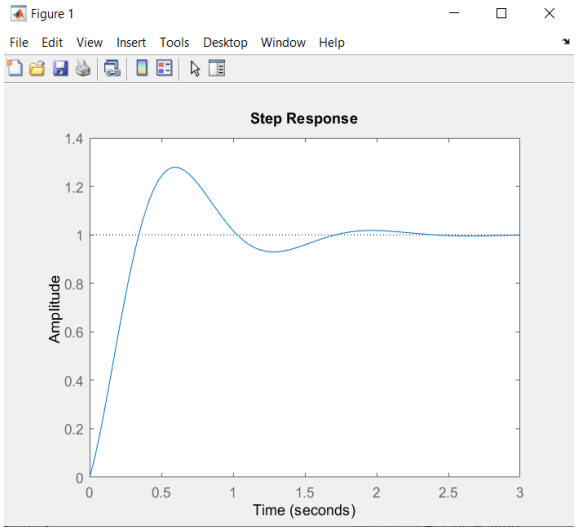
```
>> %5.ornek
syms s
G1=2/((s+1)*(s+8));
H=0.2;
Gk1=G1/(1+G1*H);
Gol=4*Gk1*(1/s);
GCL=Gol/(1+Gol*1)

GCL =

8/(s*(2/(5*(s + 1)*(s + 8)) + 1)*(8/(s*(2/(5*(s + 1)*(s + 8)) + 1)*(s + 1)*(s + 8)) + 1)*(s + 1)*(s + 8))
```

6.SORU

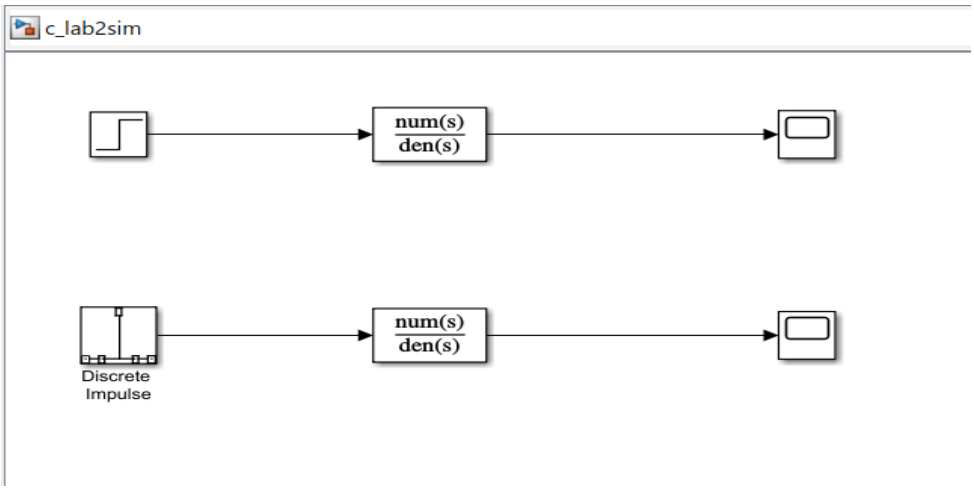
```
>> %6.ornek
num=[2 25];
den=[1 4 25];
G=tf(num,den)
step(G)
impulse(G)

G =

     2 s + 25
  --------------
  s^2 + 4 s + 25

Continuous-time transfer function.

>> step(G)
>> impulse(G)
fx >>
```



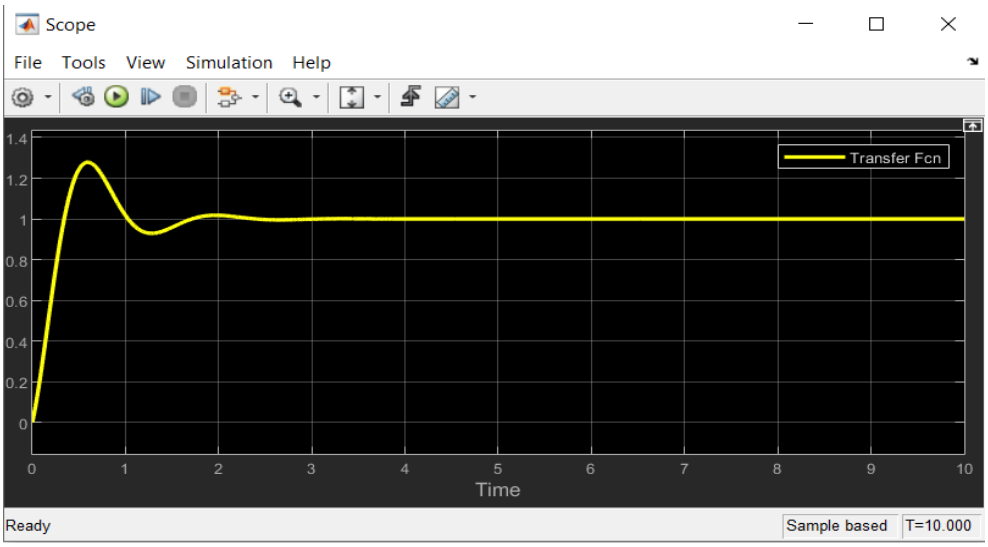
Şekil 1 Impulse response graph



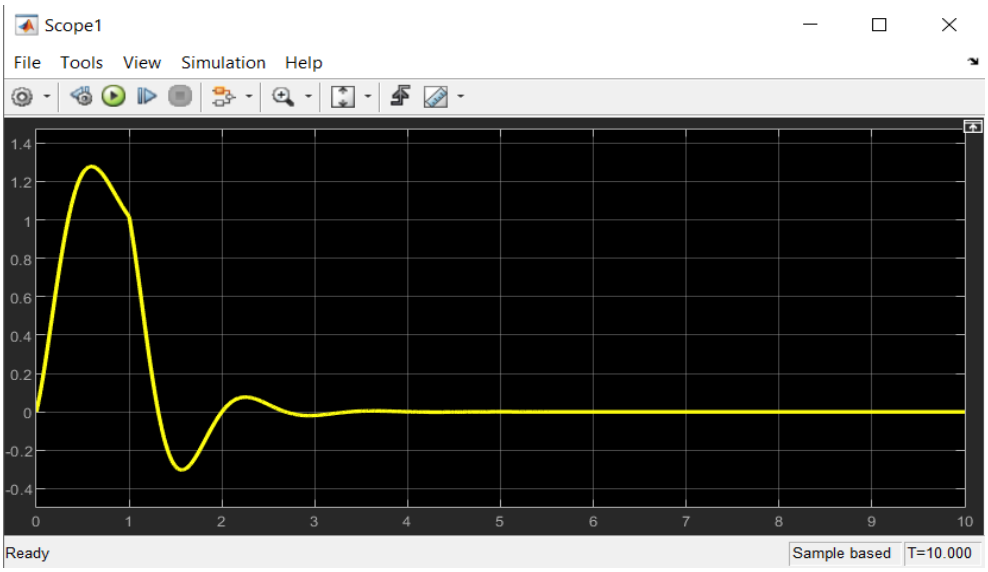
Şekil 2 Step response graph



Şekil 3 Simulink



Şekil 4 Scope1 view



Şekil 5 Scope2 view