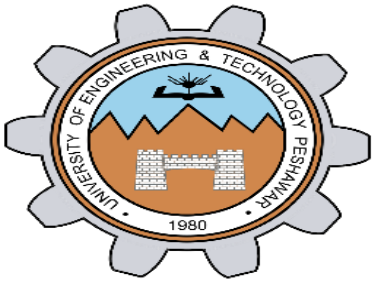
Lab report no 8



Fall 2022

Control System Lab

Submitted By

Name	Registration No
Muhammad Ali	**19pwcse1801**

Section: **A**

Date: 27,12,22

Submitted to: Dr Muniba Ashfaq

Department of Computer Systems Engineering
University of Engineering and Technology, Peshawar

Objectives: -

- To understand Residue of transfer function
- To learn Frequency Domain modelling

OBJECTIVES:

TASK 01: -
F(s)=2/(s+1)(s+2)^2

```
%Task one num=2;
den=[-1 -2 -2];
po=poly(den);
[r,b,k] = residue(num,po)
```

OUTPUT: -

```
>> lab8

r =

   -2.0000
   -2.0000
    2.0000


b =

   -2.0000
   -2.0000
   -1.0000


k =

     []
```

TASK 02: -

2) **F(s)=3/s(s^2+2s + 5)**

```
%Task 2
num2 = 3;
root2 = [ 1 2 5];
d=roots(root2)
p2=[0,d(1) , d(2)]
den2=poly(p2)
[r,b,k]=residue(num2,den2)
```

OUTPUT: -

```
d =

  -1.0000 + 2.0000i
  -1.0000 - 2.0000i


p2 =

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


den2 =

     1     2     5     0


r =

  -0.3000 + 0.1500i
  -0.3000 - 0.1500i
   0.6000 + 0.0000i


b =

  -1.0000 + 2.0000i
  -1.0000 - 2.0000i
```

```
b =

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


k =

     []
```

TASK 03:

3) **F(s)=5/(s+1)(s+2)(s+3)**

```
%Task 3 num3 = 5;
root3 = [ -1 -2 -5];
den3=poly(root3)
[r,b,k]=residue(num3,den3)
```

OUTPUT:

```
den3 =

     1     8    17    10


r =

    0.4167
   -1.6667
    1.2500


b =

   -5.0000
   -2.0000
   -1.0000


k =

     []
```

TASK 04: -

Find inverse laplace transform of the following using symbolic toolbox.

F(s)=1/s(s+1)

```
%task 4 syms s
C=1/(s+(s+2));
C = ilaplace(C)
pretty(C)
```

OUTPUT: -

```
C =

exp(-t)/2

exp(-t)
-------
   2
```

TASK 05: -

Find inverse laplace transform of Question one ,two, and three

```
%Task 5
%inver laplace transform question one , two,and three
C=2/(s+1)*(s+2)^2;  C
= ilaplace(C)
pretty(C)
%Task 6
C=3/s*(s^2+2*s + 5);  C
= ilaplace(C) pretty(C)
%task 7
C=5/(s+1)*(s+2)*(s + 3);
C = ilaplace(C) pretty(C)
```

OUTPUT: -

```
C =

2*exp(-t) + 6*dirac(t) + 2*dirac(1, t)

2 exp(-t) + 6 dirac(t) + 2 dirac'(t)


C =

6*dirac(t) + 3*dirac(1, t) + 15

6 dirac(t) + 3 dirac'(t) + 15


C =

10*exp(-t) + 20*dirac(t) + 5*dirac(1, t)

10 exp(-t) + 20 dirac(t) + 5 dirac'(t)
```

TASK 06: -

Use matlab and symbolic toolbox to find the value of .

$(2s+2)I_1(s)$ $-(s2+1)I_2(s)$ $-I_3(s) = V(s)$

$-(2s+1)I_1(s)$ $+(9s+1)I_2(s)$ $-4sI_3(s) = 0$

$-I_1(s)$ $-4sI_2(s)$ $+(4s+1+1/s)I_3(s) = 0$

```
%task 8 last task.  syms
s I1 I2 I3 V
A = [(2*s + 2)*(-1 * (2*s + 1))*(-1);
    (-1*(2*s + 2))*(9*s + 1)*(-4 *s);
    -1*(-4*s)*((4*s) +1 +1/s)];
B=[I1;I2;I3];
C=[V; 0; 0]; B=inv(A)*C;
pretty(B)
```