

Lab 12

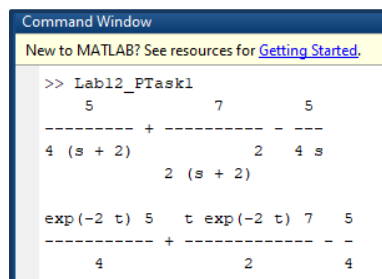
PRE-LAB

Task 1:

Code:

```
1 - syms t s % creates a symbolic variable
2 - f = -1.25+3.5*t*exp(-2*t)+1.25*exp(-2*t);
3 - l = laplace(f,s);
4 - pretty(l);
5 - il = ilaplace(l,t);
6 - pretty(il); % prints X in a plain-text
7 - % format that resembles typeset mathematics
8 - |
```

Output:



Command Window

New to MATLAB? See resources for [Getting Started](#).

```
>> Lab12_PTask1
```

$$\frac{5}{4(s+2)} + \frac{7}{2(s+2)^2} - \frac{5}{4s}$$

$$\exp(-2t) \frac{5}{4} + t \exp(-2t) \frac{7}{2} - \frac{5}{4}$$

In the above output:

1. Laplace Transform

2. Inverse Laplace Transform

Task 2:

Code:

```
1 - syms t s % creates a symbolic variable
2 - f = 1;
3 - l = laplace(f,s);
4 - pretty(l); % prints X in a plain-text
5 - % format that resembles typeset mathematics
6 - |
```

Output:

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Lab12_PTask2
1
-
s
```

In the above output:

Laplace Transform

Task 3:

Code:

```
1 - syms s t % creates a symbolic variable
2 - numerator = [ 1 0 -3 2 ];
3 - denominator = [ 1 4 5 ];
4 - [R, P, K] = residue(numerator,denominator);%Partial fraction
5 - %expansion (partial fraction decomposition)
6 - X = R(1)/(s-P(1)) + R(2)/(s-P(2)) + s*K(1) + K(2);
7 - pretty(X); % prints X in a plain-text
8 - % format that resembles typeset mathematics
9 - |
```

Output:

```
Command Window
New to MATLAB? See resources for Getting Started.

>> Lab12_PTask3

      4 - 3i      4 + 3i
s + ---- + ---- - 4
      s + 2 - i   s + 2 + 1i
```

In the above output:

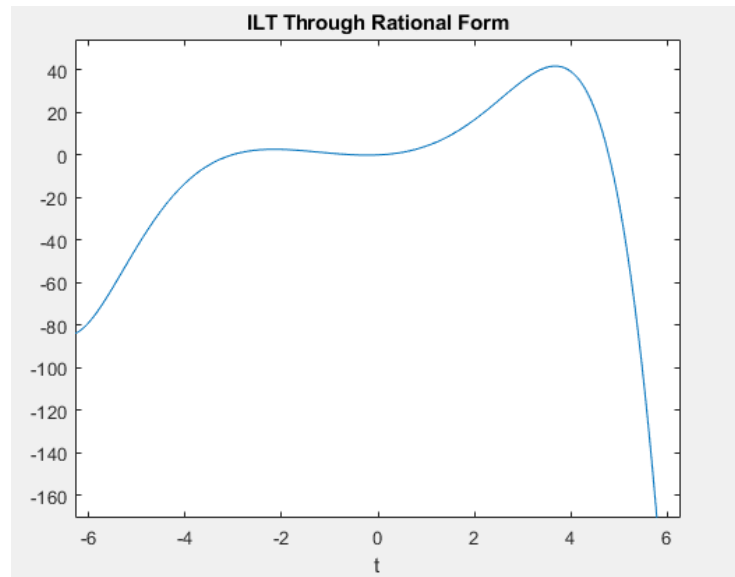
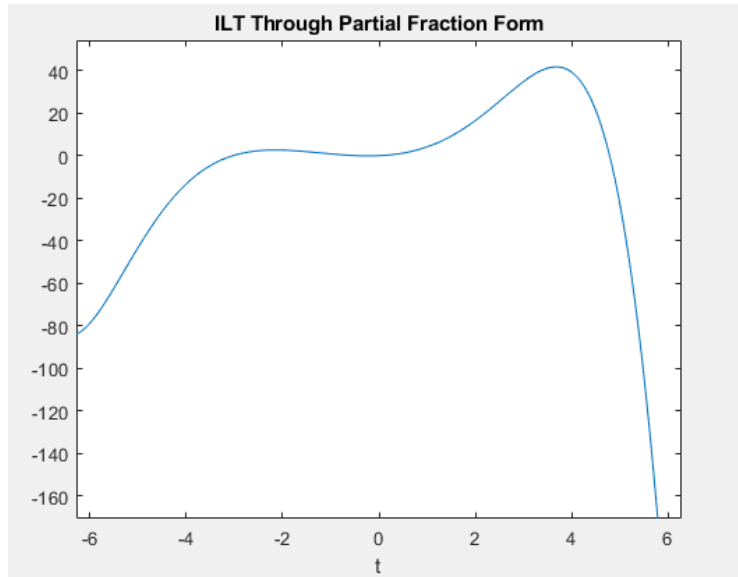
Partial Fraction Form

Task 4:

Code:

```
1 - syms s t % creates a symbolic variable
2 - numerator = [ 1 5 4 ];
3 - denominator = [ 1 0 0 0 1 ];
4 - [R, P, K] = residue(numerator,denominator);
5 - X = R(1)/(s-P(1)) + R(2)/(s-P(2)) + R(3)/(s-P(3)) + R(4)/(s-P(4)) ;
6 - il = ilaplace(X,t);
7 - ezplot(il); %plots the expression over the default domain
8 - title('ILT Through Partial Fraction Form');
9 - syms s
10 - figure(); % creates a new figure window
11 - rational = (s^2 + 5*s + 4)/(s^4 + 1);
12 - il2 = ilaplace(rational,t);
13 - ezplot(il2);
14 - title('ILT Through Rational Form');
15 - |
```

Graph:



THE END