DIGITAL ASSIGNMENT - 4

FALL SEMESTER : 2018-19

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Slot: L5+L6

Course Name: CALCULUS FOR ENGINEERS (MATLAB)

Course Code: MAT1011

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Question 1.

Write a MATLAB code and execute the following:

(i) Draw the surface of the function e^x+e^y.

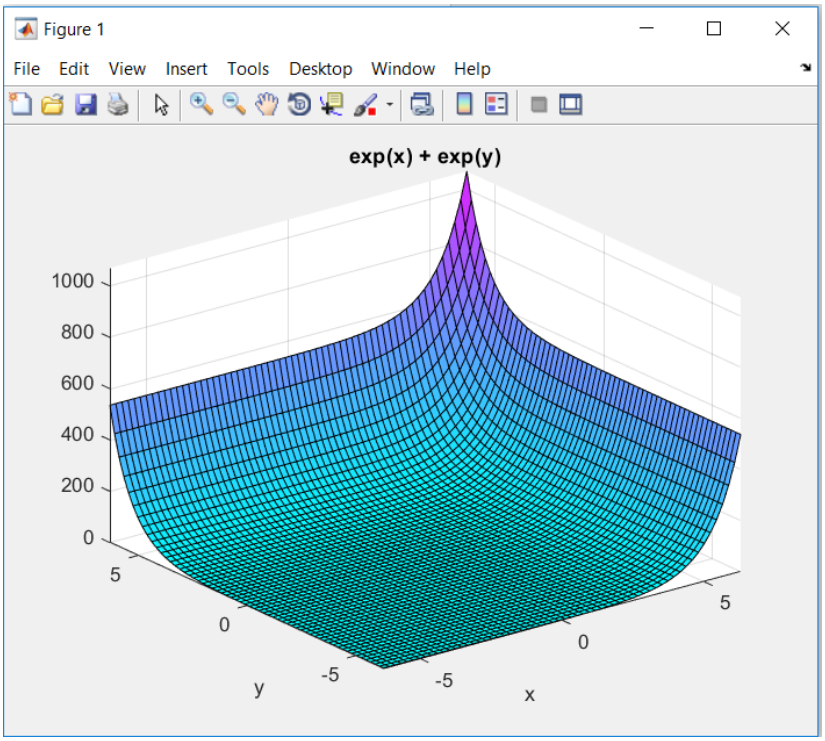
(ii) Draw the 3-D plot for the function f(t) = (t, sin(t), cos(t)), where 0≤t≤100.

Solution:

(i) CODE:-

```
clc
clearvars
syms x y
f=exp(x)+exp(y)
ezsurf(f)
colormap cool
```

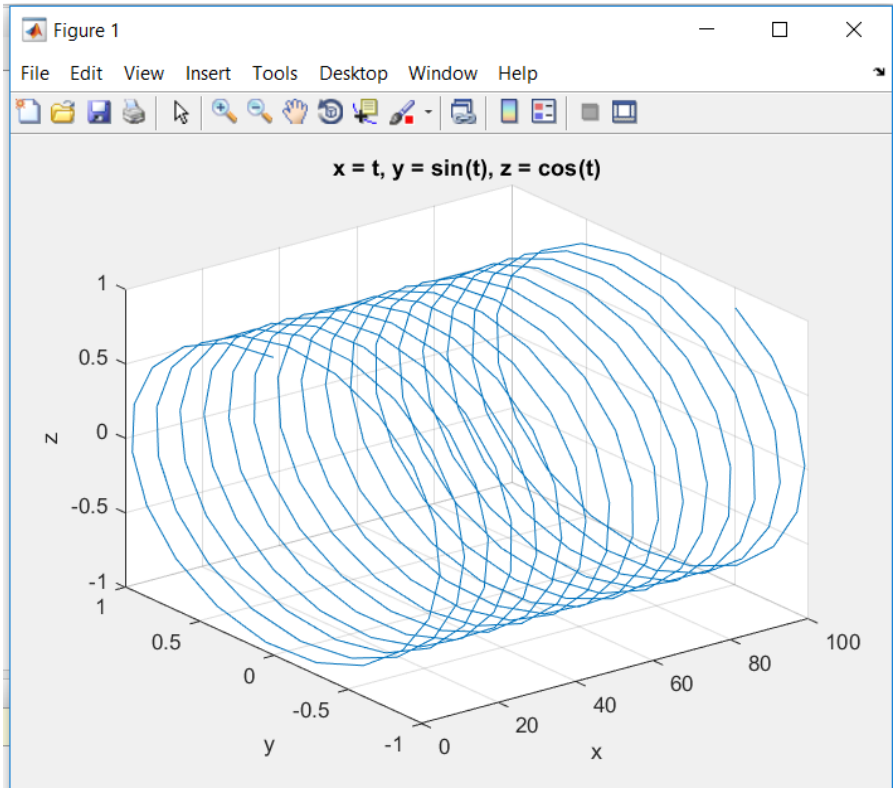
GRAPH:-



(ii) CODE:-

```
clc
clearvars
syms t
ezplot3(t,sin(t),cos(t),[0,100])
```

GRAPH:-



Question 2.

Write a MATLAB code to find the following and execute it:

(i) $L\left\{e^{-2t}+\cos^2 t-\sin 2t.\cos t\right\}$

(ii) $L\{f(t)\}$, where $f(t)=\begin{cases}1 & if\ 0<t<1\\ \sin t & if\ 1<t<2\\ -1 & if\ \ t>2\end{cases}$

(iii) $L^{-1}\left\{\dfrac{s+1}{(s-1)(s^2+s-1)}\right\}$

Solution:

(i) CODE:-

```
clear all
clc
syms t
f=input('Enter the function of t: ');
F=laplace(f);
disp(['L{',char(f),'}=',char(F)]);
```

INPUT:-

Command Window

New to MATLAB? See resources for Getting Started.

```
Enter the function of t: exp(-2*t)+cos(t)*cos(t)-sin(2*t)*cos(t)
```

OUTPUT:-

L{exp(-2*t) + cos(t)^2 - sin(2*t)*cos(t)} =

1/(s + 2) - 1/(2*(s^2 + 1)) - 3/(2*(s^2 + 9)) + (s^2 + 2)/(s*(s^2 + 4))

```
L{exp(-2*t) + cos(t)^2 - sin(2*t)*cos(t)}=1/(s + 2) - 1/(2*(s^2 + 1)) - 3/(2*(s^2 + 9)) + (s^2 + 2)/(s*(s^2 + 4))
```

(ii) CODE:

```
clear all
clc
syms t
f=input('Enter the function of t: ');
F=laplace(f);
F=simplify(F);
disp(['L{f(t)}=',char(F)]);
```

INPUT:

```
Enter the function of t: 1*(heaviside(t)-heaviside(t-1))+(sin(t))*(heaviside(t-1)-heaviside(t-2))+(-1)*heaviside(t-2)
```

OUTPUT:

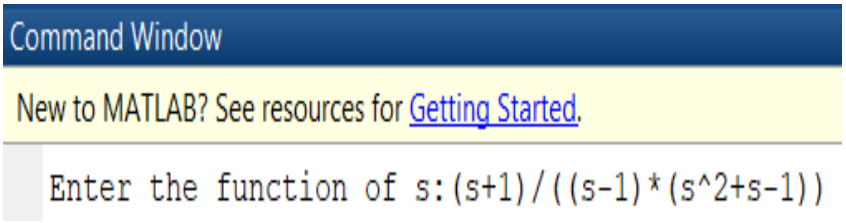
L{f(t)}= -(s + 2*exp(2i) + s*exp(4i) + 2*s^2*exp(2i) - s^2*exp(4i)*1i + 2*exp(2i)*exp(s) + s^2*1i - 2*exp(2*s)*exp(2i) - s*exp(1i)*exp(s) - s*exp(3i)*exp(s) – s^2*exp(1i)*exp(s)*1i + 2*s^2*exp(2i)*exp(s) + s^2*exp(3i)*exp(s)*1i – 2*s^2*exp(2*s)*exp(2i))/(2*s*exp(2*s)*exp(2i) + 2*s^3*exp(2*s)*exp(2i))

```
L{f(t)}=-(s + 2*exp(2i) + s*exp(4i) + 2*s^2*exp(2i) - s^2*exp(4i)*1i + 2*exp(2i)*exp(s) + s^2*1i - 2*exp(2*s)*exp(2i)
- s*exp(1i)*exp(s) - s*exp(3i)*exp(s) - s^2*exp(1i)*exp(s)*1i + 2*s^2*exp(2i)*exp(s) + s^2*exp(3i)*exp(s)*1i
– 2*s^2*exp(2*s)*exp(2i))/(2*s*exp(2*s)*exp(2i) + 2*s^3*exp(2*s)*exp(2i))
```

(iii) CODE:

```
clear all
clc
syms s
F=input('Enter the function of s:');
f=ilaplace(F);
disp(['f(t)=',char(f)]);
```

INPUT:-



OUTPUT:

f(t) = 2*exp(-t/2)*(cosh((5^(1/2)*sinh((5^(1/2)*t)/2))/5)

```
f(t)=2*exp(t) - 2*exp(-t/2)*(cosh((5^(1/2)*t)/2) + (2*5^(1/2)*sinh((5^(1/2)*t)/2))/5)
```