

Lab 4**MATLAB Code:**

```
1 disp('1. ');
2 syms y(t)
3 eqn=diff(y,t,2)+4*diff(y,t,1)+4*y==exp(-2*t); % differential equation
4 Dy=diff(y,t); % derivative
5 cond=[y(0)==0, Dy(0)==4];% initial conditions
6 ysol(t)=dsolve(eqn,cond)
7
8 disp('2. ');
9 syms y(t)
10
11 eqn=diff(y,t,2)+y==sin(t);
12
13 Dy=diff(y,t);
14
15 cond=[y(0)==0, Dy(0)==4];
16
17 ysol(t)=dsolve(eqn,cond)
18
19 disp('3. ');
20 syms y(t)
21
22 eqn=diff(y,t,2)-6*diff(y,t,1)+9*y==t*exp(3*t);
23
24 Dy=diff(y,t);
25
26 cond=[y(0)==0, Dy(0)==4];
27
28 ysol(t)=dsolve(eqn,cond)
29
30 disp('4. ');
```

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30     disp('4. ');
31     syms y(t)
32
33     eqn=diff(y,t,2)+2*diff(y,t,1)+10*y== -6*exp(-t)*sin(3*t);
34
35     Dy=diff(y,t);
36
37     cond=[y(0)==0, Dy(0)==1];
38
39     ysol(t)=dsolve(eqn,cond)
40
41     disp('5. ');
42     syms y(x) z(x)
43
44     equations = [diff(y,x)+ diff(z,x) - 3*z == 0, diff(y, x, 2) + diff(z,x)== 0]
45
46     Dy =diff(y,x);
47
48     initialConditions = [y(0)==0,Dy(0)==0, z(0)== 4/3];
49
50     [ySol, zSol] = dsolve(equations,initialConditions)

```

MATLAB Code Output:

>> Lab4

1.

ysol(t) =

$(\exp(-2*t)*(t^2 + 8*t))/2$

2.

ysol(t) =

$(35*\sin(t))/8 - \sin(3*t)/8 - \cos(t)*(t/2 - \sin(2*t)/4)$

3.

ysol(t) =

$4*t*\exp(3*t) + (t^3*\exp(3*t))/6$

4.

ysol(t) =

$(\exp(-t)*(\sin(3*t) + \sin(9*t) + 12*t*\cos(3*t) - 2*\cos(3*t)*\sin(6*t)))/12$

5.

equations(x) =

$[\text{diff}(y(x), x) - 3z(x) + \text{diff}(z(x), x) == 0, \text{diff}(y(x), x, x) + \text{diff}(z(x), x) == 0]$

ySol =

$x - \exp(4x)/4 + 1/4$

zSol =

$\exp(4x) + 1/3$