Lab 3

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 squation
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.');

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        intitialConditions = [y(0)==0,Dy(0)==0, z(0)== 4/3];
49
50        [ySol, zSol] = dsolve(equations,intitialConditions)
```

Output:

```
Command Window
>> Lab3
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) =

[diff(y(x), x) - 3*z(x) + diff(z(x), x) == 0, diff(y(x), x, x) + diff(z(x), x) == 0]


ySol =

x - exp(4*x)/4 + 1/4


zSol =

exp(4*x) + 1/3
```