

Assignment-1(part-5)

Q.1: Find the numerical solution of following ordinary differential equations:

1. $y' + 4xy = 0; y(1) = 4$

2. $3y' + 2y = 4x; y(2) = 3$

Solution:

1.

```
sol=dsolve('Dy+4*x*y=0','y(1)=4','x')
x=[-10:1:10];
y=inline(sol)
plot(x,y(x))
xlabel('X')
ylabel('Y(x)')
title('Graph of ODE')
legend('x val')
```

2 .

```
sol=dsolve('3*Dy+2*y=4*x','y(2)=3','x')
x=[-10:1:10];
y=inline(sol)
plot(x,y(x))
xlabel('X')
ylabel('Y(x)')
title('Graph of ODE')
legend('x val')
```

Q.2: Find the numerical solution of system of ordinary differential equations:

1. $\frac{dx}{dt} = 3x + 2y$

$$\frac{dy}{dt} = xy$$

$$x(0) = 3, y(0) = 2;$$

2. $\frac{dx}{dt} = x + 2y$

$$\frac{dy}{dt} = 3x - 2$$

$$x(0) = 3, y(0) = 2;$$

Solution:

1.

```
f=@(t,x)[y(1)-3*x(1)-2*x(2);y(2)-x(1)*x(2)];  
[t xsol]=ode45(f,[-10 10],[3 2])  
plot(t,xsol(:,1),'b.',t,xsol(:,2),'r')  
xlabel('Time t')  
ylabel('x & y')  
title('System of ODE')  
legend('x value', 'y value')
```

2.

```
f=@(t,x)[y(1)-x(1)-2*x(2);y(2)-3*x(1)+2];  
[t xsol]=ode45(f,[-10 10],[3 2])  
plot(t,xsol(:,1),'b.',t,xsol(:,2),'r')  
xlabel('Time t')  
ylabel('x & y')  
title('System of ODE')  
legend('x value', 'y value')
```