Power Series

Code 1:-

```
clc
clear all
syms x c_0 c_1 c_2 c_3 c_4 c_5
p1x=input('Coefficient of D2y:');
p2x=input('Coefficient of Dy:');
p3x=input('Coefficient of y:');
c=[c_0,c_1,c_2,c_3,c_4,c_5];
y=sum(c.*(x).^(0:5));
dy=diff(y);
d2y=diff(dy);
ode=p1x*d2y+p2x*dy+p3x*y;
ps=collect(ode,x);
d=coeffs(ps,x);
[c_2,c_3,c_4,c_5]=solve(d(1),d(2),d(3),d(4),'c_2,c_3,c_4,c_5');
z=subs(y);
disp('The general solution of the givben ode around x=0 is given
by:')
disp(z)
i1=input('enter y(0):');
i2=input('enter Dy(0):');
zz=subs(z,[c_0,c_1],[i1,i2])
disp('The particular solution of the given ode around x=0 is given
by:')
disp(zz)
ezplot(zz,[-10,10])
```

Problem 1 :-

Coefficient of D2y:x^2-4

Coefficient of Dy:3*x

Coefficient of y:1

The general solution of the givben ode around x=0 is given by:

(c_1*x^5)/30 + (3*c_0*x^4)/128 + (c_1*x^3)/6 + (c_0*x^2)/8 + c_1*x + c_0

enter y(0):4

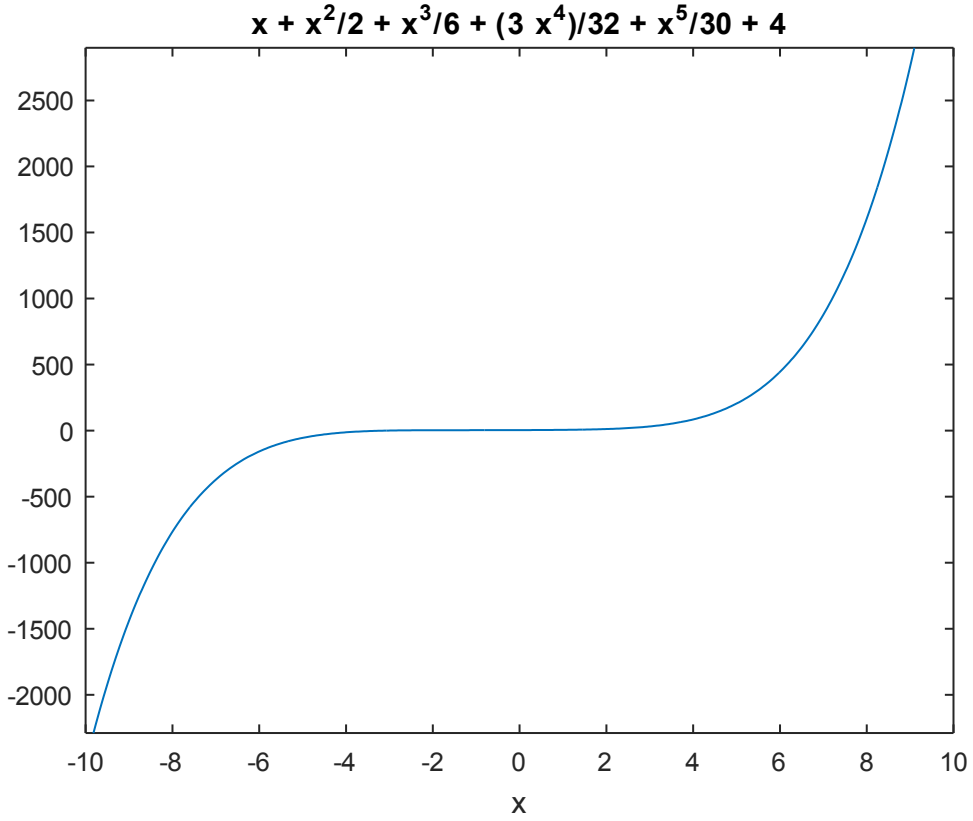
enter Dy(0):1

zz =

x^5/30 + (3*x^4)/32 + x^3/6 + x^2/2 + x + 4

The particular solution of the given ode around x=0 is given by:

x^5/30 + (3*x^4)/32 + x^3/6 + x^2/2 + x + 4



Problem 2 :-

Coefficient of D2y:9-9*x

Coefficient of Dy:-12

Coefficient of y:4

The general solution of the given ode around x=0 is given by:

((352*c_1)/1215 - (83*c_0)/729)*x^5 + ((28*c_1)/81 - (11*c_0)/81)*x^4 + ((4*c_1)/9 - (14*c_0)/81)*x^3 + ((2*c_1)/3 - (2*c_0)/9)*x^2 + c_1*x + c_0

enter y(0):5

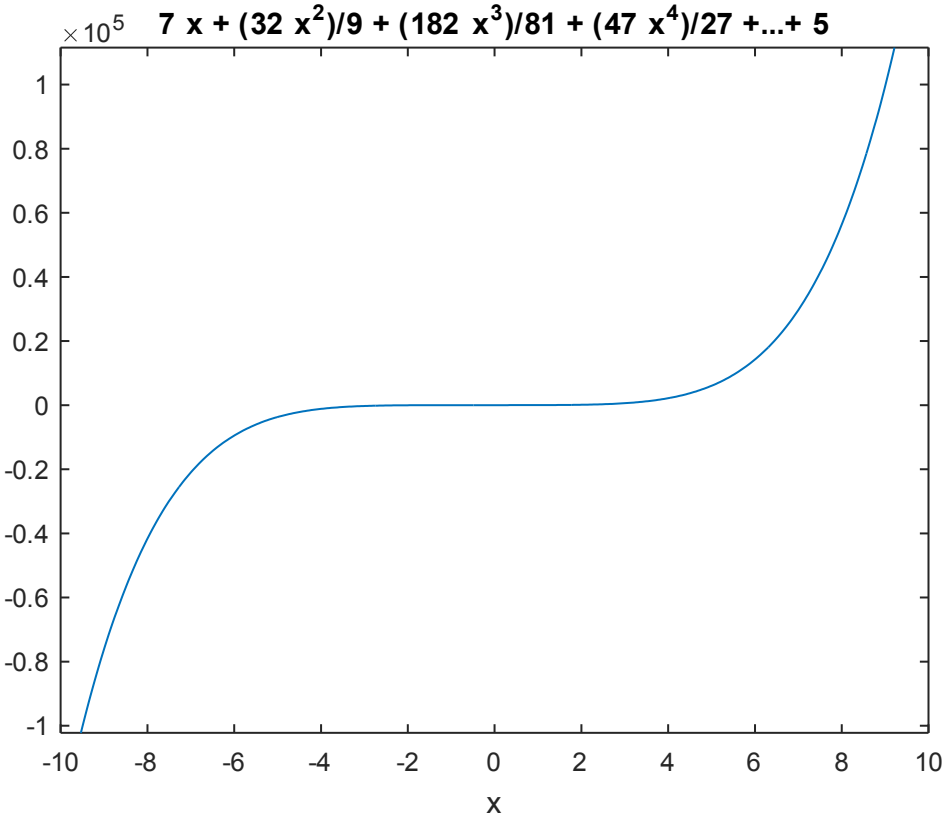
enter Dy(0):7

zz =

(5317*x^5)/3645 + (47*x^4)/27 + (182*x^3)/81 + (32*x^2)/9 + 7*x + 5

The particular solution of the given ode around x=0 is given by:

(5317*x^5)/3645 + (47*x^4)/27 + (182*x^3)/81 + (32*x^2)/9 + 7*x + 5



Code 2:-

```
clc
clear all
syms x c_0 c_1 c_2 c_3 c_4 c_5
p1x=input('Coefficient of D2y:');
p2x=input('Coefficient of Dy:');
p3x=input('Coefficient of y:');
rhs = input('Enter the non homogenous term : ')
c=[c_0,c_1,c_2,c_3,c_4,c_5];
y=sum(c.*(x).^(0:5));
dy=diff(y);
d2y=diff(dy);
ode=p1x*d2y+p2x*dy+p3x*y-rhs;
ps=collect(ode,x);
d=coeffs(ps,x);
[c_2,c_3,c_4,c_5]=solve(d(1),d(2),d(3),d(4),'c_2,c_3,c_4,c_5');
z=subs(y);
disp('The general solution of the given ode around x=0 is given
by:')
disp(z)
```

Problem 3 :-

Coefficient of D2y:x^2-4

Coefficient of Dy:3*x

Coefficient of y:1

Enter the non homogenous term : cos(x)

rhs =

cos(x)

The general solution of the given ode around x=0 is given by:

c_0 + c_1*x + x^2*(c_0/8 - cos(x)/8) + x^4*((3*c_0)/128 - (3*cos(x))/128) + (c_1*x^3)/6 + (c_1*x^5)/30