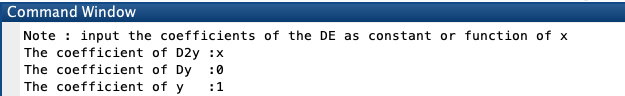
Power Series about a Singular Point

EXPERIMENT - 10

CODE: -

clear all  
clc  
syms x r c\_0 d\_0 c\_1 c\_2 c\_3 c\_4 c\_5  
disp('Note : input the coefficients of the DE as constant or function of x')  
p1x=input('The coefficient of D2y :');  
p2x=input('The coefficient of Dy :');  
p3x=input('The coefficient of y :');  
c=[c\_0, c\_1, c\_2, c\_3, c\_4, c\_5];  
y1=sum(c.\*(x).^(0:5));  
Px=p2x/p1x; Qx=p3x/p1x;  
px=x\*Px; qx=x^2\*Qx;  
a\_0=subs(px,x,0);  
b\_0=subs(qx,x,0);  
r=solve(r\*(r-1)+a\_0\*r+b\_0);  
for i=1:2  
y=expand(y1\*x^r(i));  
dy=diff(y);  
d2y=diff(dy);  
ode1=p1x\*d2y+p2x\*dy+p3x\*y;  
ode=ode1/x^r(i);  
end  
ps=collect(simplify(ode),x);  
d=coeffs(ps,x); [c\_1,c\_2,c\_3,c\_4,c\_5]=solve(d(1),d(2),d(3),d(4),d(5),'c\_1 ,c\_2,c\_3,c\_4,c\_5');  
z(i)=vpa(subs(y),3);  
disp('Linearly independent solutions are :')  
disp(z(1));  
disp(z(2));

Input 1: -

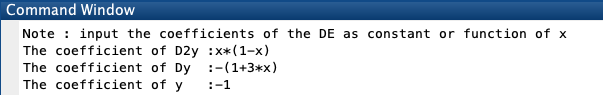


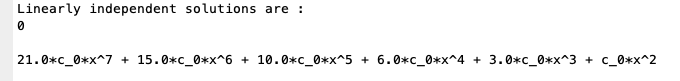
Linearly independent solutions are :

0

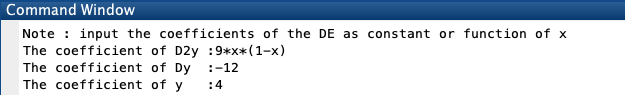
- 0.000011574074074038875892256328370422\*c\_0\*x^6 + 0.00034722222222427490123664028942585\*c\_0\*x^5 - 0.0069444444444570763153024017810822\*c\_0\*x^4 + 0.083333333333939663134515285491943\*c\_0\*x^3 - 0.5\*c\_0\*x^2 + c\_0\*x

Input 2: -





Input 3: -



Linearly independent solutions are :

0

c\_0\*x^(7/3) + 0.80000000000291038304567337036133\*c\_0\*x^(10/3) + 0.67692307692777831107378005981445\*c\_0\*x^(13/3) + 0.59230769230634905397891998291016\*c\_0\*x^(16/3) + 0.52995951416960451751947402954102\*c\_0\*x^(19/3) + 0.48178137651848373934626579284668\*c\_0\*x^(22/3)