VIT UNIVERSITY

APPLICATIONS OF DIFFERENTIAL EQUATIONS

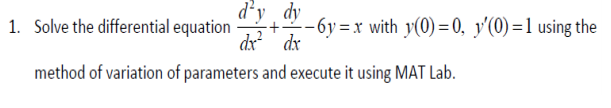
MAT2002

experiment-5

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**MATLAB CODE:**

clc

syms A B x m

p=input('Enter the coefficients a,b,c');

f=input('Enter the RHS function f(x)');

a=p(1);b=p(2);c=p(3);

disc=b^2-4\*a\*c;

m=subs(solve('a\*m^2+b\*m+c'));

if(disc>0)

CF=A\*exp(m(1)\*x)+B\*exp(m(2)\*x)

u=exp(m(1)\*x);v=exp(m(2)\*x);

elseif (disc==0)

CF=(A+B\*x)\*exp(m(1)\*x)

u=exp(m(1)\*x);v=x\*exp(m(1)\*x);

else

alfa=real(m(1));

beta=imag(m(1));

CF=exp(alfa\*x)\*(A\*cos(beta\*x)+B\*sin(beta\*x))

end

% Method of variation of parameters.

f1=f/a;

jac=u\*diff(v,x)-diff(u,x)\*v; %Jacobian of u and v

P =int(-v\*f1/jac,x);

Q=int(u\*f1/jac,x);

PI=P \*u+Q\*v;

y\_gen=CF +PI;

dy\_gen=diff(y\_gen);

cond=input('Enter the initial conditions x0, y(x0) and Dy(x0)');

eq1=(subs(y\_gen,x,cond(1))-cond(2));

eq2=(subs(dy\_gen,x,cond(1))-cond(3));

[A B]=solve(eq1,eq2);

y=subs(CF +PI)

**INPUT:**

Enter the coefficients a,b,c :[1 1 -6]

Enter the RHS function f(x) :x

Enter the initial conditions x0, y(x0) and Dy(x0) :[0 0 1]

**OUTPUT:**

CF = A\*exp(-3\*x) + B\*exp(2\*x)

y = exp(2\*x)/4 - x/6 - (2\*exp(-3\*x))/9 – 1/36

