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Course:B.Sc(H)Physics, Sem 5

Roll No.-081

SOURCE CODE:

clear;clf;

function dx=f(r, x, E)

m=940\*10^6; h=1973;D=0.755501;a=1.44;ro=0.131349;

r1=(r-ro)/r;

V=D\*(exp(-2\*a\*r1)-exp(-a\*r1));

dx(1)=x(2)

dx(2)=((2\*m)/(h\*h))\*(V-E)\*x(1)

endfunction

E1=input("Enter guess 1 for energy(eV):");

E2=input("Enter guess 2 for energy(eV):");

tol=abs(E1-E2)

while tol>0.000001

tol=abs(E1-E2)

r=0.05:0.01:4

L=length(r)

u1=ode([0.05;1],0.05,r,list(f,E1));

u2=ode([0.05;1],0.05,r,list(f,E2));

E3=(E1+E2)/2

u3=ode([0.05;1],0.05,r,list(f,E3));

if(u1(1,L)\*u3(1,L))<0 then

E2=E3

else

E1=E3

end

end

disp(E3,"The energy eigen value (eV)is:" )

plot(r,u3(1,:));

xlabel('r',"fontsize",4);ylabel('u(r)',"fontsize",4)

title("Curve for Schrodinger equation with Morse potential")

OUTPUT:

Enter guess 1 for energy(eV):-0.18

Enter guess 2 for energy(eV):-0.15

The energy eigen value (eV)is:

-0.1545955

