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

Roll No.-081

SOURCE CODE:

clc;

clear;

clf;

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

n=2500

A=eye(n,n)

A=A\*(-2)

for i=1:n-1

A(i+1,i)=1

A(i,i+1)=1

end

r=linspace(0.05,20,n)

V=zeros(n,n)

for i=1:n

r1=(r(i)-ro)/r(i)

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

end

d=(20-0.05)/n

disp(d)

B=(-(h^2)/(2\*m\*d^2))\*A+V

[u,E]=spec(B)

disp("Ground state energy :")

disp([E(1,1)])

a=gca()

a.x\_location="origin"

a.y\_location="origin"

plot2d(r',[u(:,1)])

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

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

OUTPUT:

Ground state energy :

-0.1545893

