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

Roll No.-081

Source Code:

clc;

clear;

clf;

e=3.795; m=0.511\*10^6; h=1973;a1=3;a2=5;a3=7;

n=2000

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(0.01,10,n)

V1=zeros(n,n)

for i=1:n

V1(i,i)=-((e^2)\*exp((-r(i))/a1))/r(i);

end

V2=zeros(n,n)

for i=1:n

V2(i,i)=-((e^2)\*exp((-r(i))/a2))/r(i);

end

V3=zeros(n,n)

for i=1:n

V3(i,i)=-((e^2)\*exp((-r(i))/a3))/r(i);

end

k=10/n

disp(k)

B1=(-(h^2)/(2\*m\*k^2))\*A+V1

B2=(-(h^2)/(2\*m\*k^2))\*A+V2

B3=(-(h^2)/(2\*m\*k^2))\*A+V3

[u1,E1]=spec(B1)

[u2,E2]=spec(B2)

[u3,E3]=spec(B3)

*//disp(diag(E))*

disp([E1(1,1) E2(1,1) E3(1,1)])

subplot(3,1,1)

a=gca()

a.x\_location="origin"

a.y\_location="origin"

plot(r',[u1(:,1)],'linewidth',2)

xlabel('r','fontsize',3)

ylabel('u(r)','fontsize',3)

title("a=3A")

subplot(3,1,2)

a=gca()

a.x\_location="origin"

a.y\_location="origin"

plot(r',[u2(:,1)],'linewidth',2)

xlabel('r','fontsize',3)

ylabel('u(r)','fontsize',3)

title("a=5A")

subplot(3,1,3)

a=gca()

a.x\_location="origin"

a.y\_location="origin"

plot(r',[u3(:,1)],'linewidth',2)

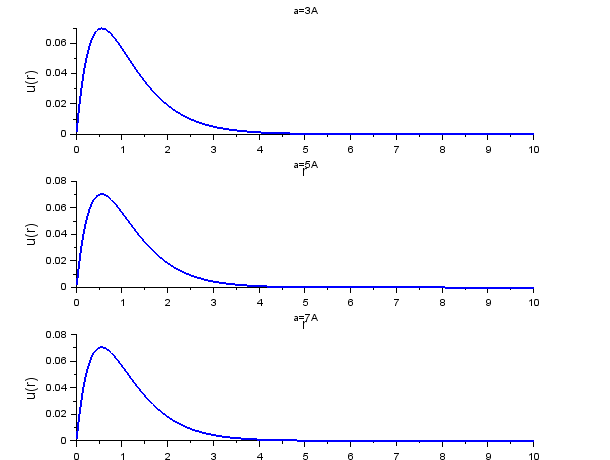
xlabel('r','fontsize',3)

ylabel('u(r)','fontsize',3)

title("a=7A")

Output:

-8.9553988 -10.504971 -11.221523



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