clc;

clear;

close;

%getting inputs from the user;

eqn=input('Enter the equation for X: ','s');

f= inline(eqn,'x');

x1=input('Enter the initial guess: ');

choice = input('Enter: 0-termination parameter/ 1-number of iterations : ');

switch(choice)

case 0

epsilon = input('Enter the termination value: ');

case 1

num= input('Enter the number of iterations: ');

otherwise

print('Enter a valid input');

end

k=1;

if abs(x1)>0.01

d\_x1 = 0.01\*abs(x1);

else

d\_x1 = 0.0001;

end

%calculating f\_doubledash of x1

f\_dash\_x1 = (feval(f,(x1+d\_x1))- (feval(f,(x1-d\_x1))))/(2\*d\_x1);

f\_doubledash\_x1 = (feval(f,(x1+d\_x1))-(2\*feval(f,x1))+(feval(f,(x1-d\_x1))))/(d\_x1^2);

x2 = x1-f\_dash\_x1/f\_doubledash\_x1;

if abs(x2)>0.01

d\_x2 = 0.01\*abs(x2);

else

d\_x2 = 0.0001;

end

%calculating f\_dash of x2

f\_dash\_x2 = (feval(f,(x2+d\_x2)) - (feval(f,(x2-d\_x2))))/(2\*d\_x2);

%Iterations

switch(choice)

case 0

while abs(f\_dash\_x2)>epsilon

x1=x2;

if abs(x1)>0.01

d\_x1 = 0.01\*abs(x1);

else

d\_x1 = 0.0001;

end

f\_dash\_x1 = (feval(f,(x1+d\_x1))- (feval(f,(x1-d\_x1))))/(2\*d\_x1);

f\_doubledash\_x1 = (feval(f,(x1+d\_x1))-(2\*feval(f,x1))+(feval(f,(x1-d\_x1))))/(d\_x1^2);

x2 = x1-f\_dash\_x1/f\_doubledash\_x1;

if abs(x2)>0.01

d\_x2 = 0.01\*abs(x2);

else

d\_x2 = 0.0001;

end

f\_dash\_x2 = (feval(f,(x2+d\_x2)) - (feval(f,(x2-d\_x2))))/(2\*d\_x2);

k=k+1;

end

case 1

for i = 1:num-1

x1=x2;

if abs(x1)>0.01

d\_x1 = 0.01\*abs(x1);

else

d\_x1 = 0.0001;

end

f\_dash\_x1 = (feval(f,(x1+d\_x1))- (feval(f,(x1-d\_x1))))/(2\*d\_x1);

f\_doubledash\_x1 = (feval(f,(x1+d\_x1))-(2\*feval(f,x1))+(feval(f,(x1-d\_x1))))/(d\_x1^2);

x2 = x1-f\_dash\_x1/f\_doubledash\_x1;

if abs(x2)>0.01

d\_x2 = 0.01\*abs(x2);

else

d\_x2 = 0.0001;

end

f\_dash\_x2 = (feval(f,(x2+d\_x2)) - (feval(f,(x2-d\_x2))))/(2\*d\_x2);

k=k+1;

end

end

fprintf('The solution lies at %f, it has been obtained after %d iterations \n',x2,k);