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***INSTITUTE OF INFORMATION TECHNOLOGY***

***JAHANGIRNAGAR UNIVERSITY***

**Lab Report :** 03

**Submission Date :** 28/11/2020

**Course Tittle :** Numerical Analysis Lab

**Course Code :** ICT - 2106

**Submitted To Submitted By**

[Dr M Shamim Kaiser](https://juniv.edu/teachers/rhemel) MD. Shakil Hossain

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IIT - JU

**Problem 1(a).**

**Code:**

f =@(x)x^3-2\*x-5;

x0=2;

x1=3;

for i=1:100

x2 = x0 - (f(x0)\* (x1-x0)/(f(x1)-f(x0)));

c = f(x2)

a\_c = abs(c);

if (a\_c <= 10^-5)

break

end

if f(x0)\*c <0

x1=x2;

continue

else

x0=x2;

continue

end

end

i

**Output:**

>> Lab3\_Problem1a

x2 =

2.0946

c =

-6.8619e-06

i =

12

**Problem 1(b).**

**Code:**

f =@(x)x\*sin(x)+cos(x);

x0=1;

x1=2;

for i=1:100

x2 = x0 - (f(x0)\* (x1-x0)/(f(x1)-f(x0)));

c = f(x2)

a\_c = abs(c);

if (a\_c <= 10^-5)

break

end

if f(x0)\*c <0

x1=x2;

continue

else

x0=x2;

continue

end

end

i

**Output:**

>> Lab3\_Problem1b

x2 =

9.3179

c =

7.0451e-07

i =

11

**Problem 1(c).**

**Code:**

f =@(x)e^-x;

x0=0;

x1=1;

for i=1:100

x2 = x0 - (f(x0)\* (x1-x0)/(f(x1)-f(x0)));

c = f(x2)

a\_c = abs(c);

if (a\_c <= 10^-5)

break

end

if f(x0)\*c <0

x1=x2;

continue

else

x0=x2;

continue

end

end

i

**Output:**

>> Lab3\_Problem1c

x2 =

0.5671

c =

-1.2066e-06

i =

6

**Problem 2. (5 decimal)**

**Code:**

syms x;

y=x^3-2\*x-5;

a=2;

b=3;

error=0.00001;

fa = eval(subs(y,x,a));

fb = eval(subs(y,x,b));

if fa\*fb > 0

disp('Root does not exist between the range');

else

c = a - (a-b) \* fa/(fa-fb);

fc = eval(subs(y,x,c));

i=1;

while abs(fc)>error

i=i+1;

if fa\*fc< 0

b =c;

fb = eval(subs(y,x,b));

else

a =c;

fa = eval(subs(y,x,a));

end

c = a - (a-b) \* fa/(fa-fb);

fc = eval(subs(y,x,c));

end

fprintf('\nRoot is: %f\n', c);

end

i

**Output:**

>> Lab3\_Problem2

Root is: 2.094551

i =

12

**Problem 2. (8 decimal)**

**Code:**

syms x;

y=x^3-2\*x-5;

a=2;

b=3;

error=0.00000001;

fa = eval(subs(y,x,a));

fb = eval(subs(y,x,b));

if fa\*fb > 0

disp('Root does not exist between the range');

else

c = a - (a-b) \* fa/(fa-fb);

fc = eval(subs(y,x,c));

i=1;

while abs(fc)>error

i=i+1;

if fa\*fc< 0

b =c;

fb = eval(subs(y,x,b));

else

a =c;

fa = eval(subs(y,x,a));

end

c = a - (a-b) \* fa/(fa-fb);

fc = eval(subs(y,x,c));

end

fprintf('\nRoot is: %f\n', c);

end

i

**Output:**

>> Lab3\_Problem2

Root is: 2.094551

i =

19

**Problem 4.**

**Code:**

a=[1 0 -2 -5];

x1=2;

x2=3;

for i=1:1000

x0=x1-[(polyval(a,x1)\*(x2-x1))/(polyval(a,x2)-polyval(a,x1))]

n=polyval(a,x0)

e=abs(n);

if(e<=10^-5)

break;

end

if polyval(a,x1)\* polyval(a,x0)

x2=x0;

continue

else

x1=x0;

continue

end

end

**Output:**

>> Lab3\_Problem4

x0 =

2.0946

n =

-3.7918e-06