**DIVISION / ROLL NO.: \_\_\_ \_D2A/55\_\_\_\_\_\_\_\_\_\_**

**Vivekanand Education Society’s Institute of Technology (Academic Year 2020-2021)**

**Subject: Engineering Mathematics- I**

**Semester: I**

**TUTORIAL/SCILAB COVER PAGE**

**TUTORIAL /SCILAB NO :- \_\_\_\_\_1\_\_\_\_\_\_**

**TUTORIAL TOPIC:- \_\_\_\_\_\_NUMERICAL METHODS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**DATE OF PERFORMANCE/SUBMISSION :- \_\_\_\_\_\_\_12/04/2021\_\_\_\_\_\_\_\_\_\_**

**NAME OF THE STUDENT: - \_\_\_\_\_\_\_\_SHREYAS ARUN SAWANT\_\_\_\_\_\_\_\_\_\_\_**

**SIGNATURE OF TEACHER: - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Name: Shreyas Arun Sawant

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SCI LAB PRACTICAL 1: GAUSS JACOBI ITERATION METHOD

QUESTION: Using suitable loop, write the sci-lab programme to obtain approximate solution by Gauss Jacobi Iteration Method. (Correct up to five decimal places)

20x+y-2z=17;

3x+20y-z=-18;

2x-3y+20z=25

INPUT CODE:

clc;

A=[20 1 -2; 3 20 -1; 2 -3 20]

B=[17; -18; 25]

disp("[A B]")

disp([A B])

disp("No. of iterations")

n=5

disp(n)

x0=0

y0=0

z0=0

for i=0:n

x(i+1)=(B(1)-A(1,2)\*y0-A(1,3)\*z0)/A(1,1)

y(i+1)=(B(2)-A(2,1)\*x0-A(2,3)\*z0)/A(2,2)

z(i+1)=(B(3)-A(3,1)\*x0-A(3,2)\*y0)/A(3,3)

x0=x(i+1)

y0=y(i+1)

z0=z(i+1)

end

disp('x=')

disp(x)

disp('y=')

disp(y)

disp('z=')

disp(z)

OUTPUT:

"[A B]"

20. 1. -2. 17.

3. 20. -1. -18.

2. -3. 20. 25.

"No. of iterations"

5.

"x="

0.85

1.02

1.00125

1.0004

0.9999662

0.9999995

"y="

-0.9

-0.965

-1.0015

-1.000025

-1.0000775

-0.9999971

"z="

1.25

1.03

1.00325

0.99965

0.9999563

0.9999918

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SCI LAB PRACTICAL 2: NEWTON RHAPSON METHOD

QUESTION: Using suitable loop, write a sci-lab program to obtain approximate root in the given interval using Newton Raphson Method (Correct up to five decimal places).

x^4-32=0 in the interval [2,3]

INPUT CODE:

clc;

deff('[y]=f(x)','y=x^4-32');

deff('[y]=fd(x)','y=4\*x^3');

x=3;x1=0;i=0;

error=0.000001;

disp("x=")

disp(x)

disp("x1=")

disp(x1)

disp("By Newton Rhapson Method")

disp("Roots")

while(abs(x-x1)>=error)

y=x-(f(x)/fd(x))

disp(y)

x1=x

x=y

i=i+1

end

disp("No. of iterations")

disp(i)

OUTPUT:

"x="

3.

"x1="

0.

"By Newton Rhapson Method"

"Roots"

2.5462963

2.3942996

2.3785716

2.3784142

2.3784142

"No. of iterations"

5.

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SCI LAB PRACTICAL 3: GAUSS SEIDEL ITERATION METHOD

QUESTION: Using suitable loop, write a sci-lab program to obtain approximate solution in the given interval using Gauss Seidel Iteration Method (Correct up to five decimal places).

12x-y+2z=3;

x+3y+3z=-1;

x+2y+5z=1;

start with (0.3,-0.8,0.3)

INPUT CODE:

clc;

A=[12 -1 2; 1 3 3; 1 2 5]

B=[3; -1; 1]

disp('[A B]=')

disp([A B])

n=5

disp("No. of iterations")

disp(n)

x0=0.3

y0=-0.8

z0=0.3

for i=0:n

x(i+1)=(B(1)-A(1,2)\*y0-A(1,3)\*z0)/A(1,1)

y(i+1)=(B(2)-A(2,1)\*x(i+1)-A(2,3)\*z0)/A(2,2)

z(i+1)=(B(3)-A(3,1)\*x(i+1)-A(3,2)\*y(i+1))/A(3,3)

x0=x(i+1)

y0=y(i+1)

z0=z(i+1)

end

disp('x=')

disp(x)

disp('y=')

disp(y)

disp('z=')

disp(z)

OUTPUT:

"[A B]="

12. -1. 2. 3.

1. 3. 3. -1.

1. 2. 5. 1.

"No. of iterations"

5.

"x="

0.1333333

0.1194444

0.0980093

0.089561

0.0859652

0.084446

"y="

-0.6777778

-0.8175926

-0.8691512

-0.8912456

-0.9005745

-0.9045187

"z="

0.4444444

0.5031481

0.5280586

0.5385861

0.5430367

0.5449183

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SCI LAB PRACTICAL 4: REGULA FALSI ITERATION METHOD

QUESTION: Using suitable loop, write a sci-lab program to obtain approximate solution in the given interval using Regula Falsi Iteration Method (Correct up to five decimal places).

x^4+x^3-7x^2-x+5=0 in the interval [2,3]

INPUT CODE:

clc;

deff('y=f(x)','y=x^4+x^3-7\*x^2-x+5')

deff('[y]=fd(x)','y=4\*x^3+3\*x^2-14\*x-1')

a=2

disp('a=')

disp(a)

disp('b=')

b=3

disp(b)

n=10

disp('No.of iteration:')

disp(n)

disp("By Regula Falsi Method")

for i=1:n

c=(a\*f(b)-b\*f(a))/(f(b)-f(a))

disp([i,c])

if f(a)\*f(c)<0 then

b=c

end

if f(b)\*f(c)<0 then

a=c

end

c1=(a\*f(b)-b\*f(a))/(f(b)-f(a))

if abs(c1-c)<0.00001 then

disp("These are the roots")

break;

end

end

OUTPUT:

"a="

2.

"b="

3.

"No.of iteration:"

10.

"By Regula Falsi Method"

1. 2.0208333

2. 2.034746

3. 2.0439135

4. 2.0499007

5. 2.0537881

6. 2.0563025

7. 2.0579248

8. 2.0589699

9. 2.0596424

10. 2.0600749

"These are the roots"