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, 2, 3, 4

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

A.Y.: 2020-2021

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"