SCILAB ASSIGNMENT - 2021-2022

- **Name : JESICA ANNIE BIJJU**
- **Division : D2C**
- **Roll No : 9**
- **DOP : 22nd Feb 2022**

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SCI LAB PRACTICAL 1: GAUSS JACOBI ITERATION METHOD

QUESTION: Using suitable loop, write the scilab programme to obtain approximate solution by Gauss Jacobi Iteration Method.(Correct up to 4 decimal places)

$$12x+2y+z = 27$$
$$2x+15y-3z= 16$$
$$2x-3y+25z= 26$$

INPUT CODE:

```
clc
A=[12,2,1;2,15,-3;2,-3,25]
B=[27;16;26]
disp('[A B]=')
disp([A B])
n=5
disp('no of iteration')
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)
```

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OUTPUT CODE :

"[A B]="

12. 2. 1. 27.
2. 15. -3. 16.
2. -3. 25. 26.

"no of iteration"

5.

"x="

2.25
1.9855556
2.0052222
2.0002360
2.0002184
2.0000334

"y="

1.0666667
0.9746667
0.9995259
0.9989268
0.9998736
0.9999413

"z="

1.04
0.988
0.9981156
0.9995253
0.9998523
0.9999677

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SCILAB PRACTICAL 2: NEWTON RAPHSON METHOD

QUESTION: Using suitable loop, write the scilab programme to obtain approximate root of $x^4 - 1.8x^3 + 6x^2 - 18x - 13.9 = 0$ in the interval [−2, −1] using Newton Raphson Method (Correct up to 4 decimal places)

$$x^4 - 1.8x^3 + 6x^2 - 18x - 13.9 = 0 \text{ in the interval } [-2, -1]$$

INPUT CODE:

```
clc;
deff('[y]=f(x)',y=x^4-1.8*x^3+6*x^2-18*x-13.9');
deff('[y]=fd(x)',y=4*x^3-5.4*x^2+12*x-18');
x=-2;x1=-1;i=0;
error=0.00001;
disp("x=");
disp(x)
disp("x1=");
disp(x1)
disp("By Newton Raphson 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 Iteration")
disp(i);
```

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OUTPUT CODE:

“x=”

-2.

“x1=”

-1.

“By Newton Raphson Method“

“Roots”

-1.1997908

-0.7428126

-0.6215593

-0.6149790

-0.6149612

-0.6149612

“No of Iteration”

6.

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SCILAB PRACTICAL 3 : GAUSS SEIDEL ITERATION

QUESTION: Using suitable loop, write a sci-lab program to obtain approximate solution using Gauss Seidel Iteration Method (Correct up to 4 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])
n=5
disp('no of iteration')
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)*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)
```

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OUTPUT CODE:

```
 "[A B]="

  20.   1.  -2.    17.
  3.    20.  -1.   -18.
  2.   -3.    20.   25.

 "no of iteration"

  5.

 "x="

  0.85
  1.0024625
  0.9999693
  1.0000005
  1.0000000
  1.0000000

  "y="

   -1.0275
   -0.9998256
   -1.0000064
   -1.0000000
   -1.0000000
   -1.0000000

 "z="

   1.010875
   0.9997799
   1.0000021
   1.0000000
   1.0000000
   1.0000000
```

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SCILAB PRACTICAL 4: REGULA FALSI METHOD

QUESTION : Using suitable loop, write a sci-lab program to obtain approximate root of x^3 -20x+20=0 in the interval [1,1.5] using Regula Falsi Method (Correct up to 4 decimal places)

x^3 -20x+20=0 in the interval [1,1.5]

INPUT CODE:

```
clc;
deff('[y]=f(x)','y=x^3-20*x+20');
x=1;x1=1.5;i=0;
a=0;
a1=1;
i=0;
error=0.00001;
disp("x=");
disp(x)
disp("x1=");
disp(x1)
disp("By Regula Falsi Method");
disp("Roots");
while(abs(a-a1)>=error)
a=(x*f(x1)-x1*f(x))/(f(x1)-f(x));
if(f(x)*f(a)<0)
x1=a;
end
if(f(x1)*f(a)<0)
x=a;
end
a1=(x*f(x1)-x1*f(x))/(f(x1)-f(x));
i=i+1;
disp(a);
end
disp("No of iterations");
disp(i);
```

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OUTPUT CODE :

"x="

1

"x1="

1.5

"By Regula Falsi Method"

"Roots"

1.0655738

1.0595274

1.0594605

"No of iterations"

3.