

CBNST LAB PRACTICAL

Date: September 17, 2021

Name : Deepankar Sharma
Course: BCA
Student Id : 20041299
University Roll No: 2092014

Regula Falsi Method

Algorithm:

1. Start
2. Define function $f(x)$
3. Input
 - a. Lower and Upper guesses x_0 and x_1
 - b. tolerable error e
4. If $f(x_0) * f(x_1) > 0$
 print "Incorrect initial guesses"
 goto 3
End If
5. Do
$$x_2 = x_0 - ((x_0 - x_1) * f(x_0)) / (f(x_0) - f(x_1))$$

 If $f(x_0) * f(x_2) < 0$
 $x_1 = x_2$
 Else
 $x_0 = x_2$
 End If

 While $\text{abs}(f(x_2)) > e$
6. Print root as x_2
7. Stop

Code :

```
#include <stdio.h>
#include <math.h>
#include <stdlib.h>
```

CBNST LAB PRACTICAL

Date: September 17, 2021

```
#define phi(x) (x*x)- log(x)- 12
```

```
double differential(double x0)
```

```
{
```

```
    const double delta = 1.0e-10;
```

```
    double x1 = x0 - delta;
```

```
    double x2 = x0 + delta;
```

```
    double y1 = phi(x1);
```

```
    double y2 = phi(x2);
```

```
    // printf("gradient= %f\n", grad);
```

```
    return (y2 - y1) / (x2 - x1);
```

```
    // return (pow(-2.718282, -1*x)-cos(x));
```

```
}
```

```
int main()
```

```
{
```

```
    int k = 0;
```

```
    double x0, x1, x2, f0, f1, f2, g0;
```

```
    int step = 1, N;
```

```
    double allErr;
```

```
    printf("Enter the allowed Error: ");
```

```
    scanf(" %lf", &allErr);
```

```
    printf("Enter the interval lower limit: ");
```

```
    scanf(" %lf", &x0);
```

```
    printf("Enter the interval upper limit: ");
```

```
    scanf(" %lf", &x1);
```

```
    f0 = phi(x0);
```

```
    f1 = phi(x1);
```

```
    if (f0 * f1 > 0.0)
```

```
    {
```

```
        printf("\n\nIncorrect Initial Guesses !!!!\n");
```

```
        exit(0);
```

```
    }
```

```
    printf("Enter maximum iteration: ");
```

```
    scanf("%d", &N);
```

```
{
```

CBNST LAB PRACTICAL

Date: September 17, 2021

```

    {
        printf("\nStep\t\tx0\t\tx1\t\tf(x0)\t\tf(x1)\t\tx2=(x0
f1-x1f0)/(f1-f0)\t\tf(x2)\n");
    }
}

```

```
do
{
```

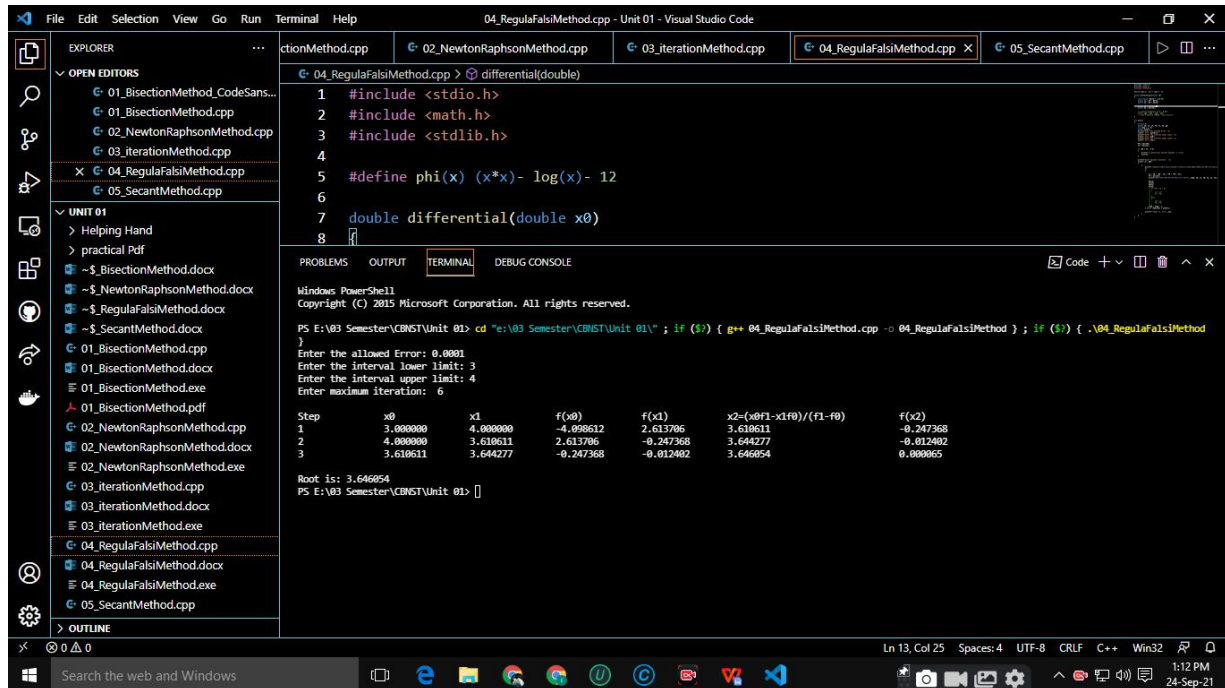
[illegible]

```
x0=x1;
x1=x2;
f0=f1;
f1=f2;
// if (f0 * f2 < 0)
// {
//     x1 = x2;
//     f1 = f2;
// }
// else
// {
//     x0 = x2;
//     f0 = f2;
// }
step = step + 1;
} while (fabs(f2) > allErr);
```

```
        printf("\nRoot is: %f\n", x2);
    }
}
```

CBNST LAB PRACTICAL

Date: September 17, 2021



```
04_RegulaFalsiMethod.cpp - Unit 01 - Visual Studio Code
04_RegulaFalsiMethod.cpp x 05_SecantMethod.cpp

1 #include <stdio.h>
2 #include <math.h>
3 #include <stdlib.h>
4
5 #define phi(x) (x*x)- log(x)- 12
6
7 double differential(double x0)
8 {
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

Windows PowerShell
Copyright (C) 2015 Microsoft Corporation. All rights reserved.

PS E:\03 Semester\CBNST\Unit 01> cd "e:\03 Semester\CBNST\Unit 01\" ; if (\$?) { g++ 04_RegulaFalsiMethod.cpp -o 04_RegulaFalsiMethod ; if (\$?) { .\04_RegulaFalsiMethod } }

Enter the allowed Error: 0.0001
Enter the interval lower limit: 3
Enter the interval upper limit: 4
Enter maximum iteration: 6

Step	x0	x1	f(x0)	f(x1)	x2=(x0f1-x1f0)/(f1-f0)	f(x2)
1	3.000000	4.000000	-4.998612	2.613706	3.610611	-0.247368
2	4.000000	3.610611	2.613706	-0.247368	3.644277	-0.012482
3	3.610611	3.644277	-0.247368	-0.012482	3.646054	0.000065

Root is: 3.646054
PS E:\03 Semester\CBNST\Unit 01>