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### **Practical No:06 Regula Falsi Method**

**Objective:** To find root of the equation using Regula Falsi method.

#### **2. 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 3End 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

### 3. Code :

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

#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);
    }
}
```

;

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

Step f(x2)	x0	x1	f(x0)	f(x1)	x2=(x0f1-x1f0)/(f1-f0)	
1 -0.247368	3.000000	4.000000	-4.098612	2.613706	3.610611	
2 -0.012402	4.000000	3.610611	2.613706	-0.247368	3.644277	
3 0.000065	3.610611	3.644277	-0.247368	-0.012402	3.646054	

Root is: 3.646054