REGULA-FALSI METHOD

$f(x) = 0$

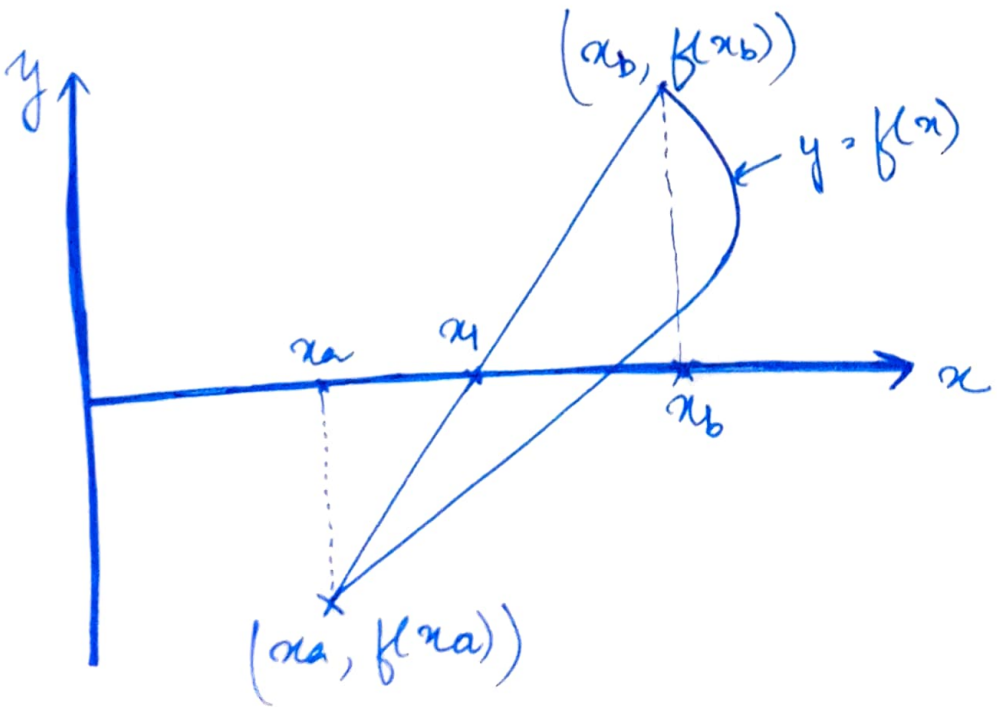
Chose 2 points x_a and x_b such that

$$f(x_a) \cdot f(x_b) < 0$$

$\Rightarrow$ A Root lies b/w x_a and x_b

The Eq^n of the chord joining the two points $(x_a, f(x_a))$ and $(x_b, f(x_b))$ is given by:

$$\frac{y - f(x_a)}{x - x_a} = \frac{f(x_b) - f(x_a)}{x_b - x_a}$$



Now, take the point of intersection of the chord with the x-axis as an approximation to the root. The point of intersection is given by:

$$x = x_1 = \frac{x_a f(x_b) - x_b f(x_a)}{f(x_b) - f(x_a)}$$

x_1 is the first approximation to the root of $f(x) = 0$.

If $f(x_1) \cdot f(x_a) < 0$

Then Root lies b/w x_a and x_1

Else Root lies b/w x_1 and x_b.

Repeat the procedure till the root is obtained to the desired accuracy.

ALGORITHM

Read x_a, x_b, eps, n

If $f(x_a) \cdot f(x_b) > 0$
    print "Interval NOT Suitable"
    exit.

For i = 1 to n

    If $|f(x_b) - f(x_a)| <$ eps
        print "The Method fails"
        exit

    $$x_1 = \frac{[x_a \cdot f(x_b) - x_b \cdot f(x_a)]}{f(x_b) - f(x_a)}$$

    If $|f(x_1)| <$ eps
        print "$\{x_1\}$ is the Root"
        exit

    If $f(x_a) \cdot f(x_1) < 0$
        $x_b = x_1$
    Else
        $x_a = x_1$