* **Daniel García**
* **Michael Agudelo**

**Python Tests**

**Common values:**

f(x) = ln(sin(x)\*\*2 + 1)-(1/2)

f’(x) = 2\*((sin(x)\*\*2 + 1)\*\*-1)\*sin(x)\*cos(x)

f1(x) = ln((sin(x)\*\*2)+1)-(1/2)-x

g(x) = ln((sin(x)\*\*2)+1)-(1/2)

h(x) = e\*\*x – x – 1

h’(x) = e\*\*x – 1

h’’(x) = e\*\*x

Tol = 0.0000001

N = 100

**Incremental Search**

X0 = -3

Delta = 0.5

N = N

**Bisection**

A = 0

B = 1

**False Rule**

A = 0

B = 1

**Newton**

X0 = 0.5

N = N

**Results:**

*Incremental Search*

There is a root of f in: [-2.5000000000,-2.0000000000]

There is a root of f in: [-1.0000000000,-0.5000000000]

There is a root of f in: [0.5000000000,1.0000000000]

There is a root of f in: [2.0000000000,2.5000000000]

There is a root of f in: [4.0000000000,4.5000000000]

There is a root of f in: [5.0000000000,5.5000000000]

There is a root of f in: [7.0000000000,7.5000000000]

There is a root of f in: [8.0000000000,8.5000000000]

There is a root of f in: [10.0000000000,10.5000000000]

There is a root of f in: [11.5000000000,12.0000000000]

There is a root of f in: [13.5000000000,14.0000000000]

There is a root of f in: [14.5000000000,15.0000000000]

There is a root of f in: [16.5000000000,17.0000000000]

There is a root of f in: [17.5000000000,18.0000000000]

There is a root of f in: [19.5000000000,20.0000000000]

There is a root of f in: [21.0000000000,21.5000000000]

There is a root of f in: [22.5000000000,23.0000000000]

There is a root of f in: [24.0000000000,24.5000000000]

There is a root of f in: [26.0000000000,26.5000000000]

There is a root of f in: [27.0000000000,27.5000000000]

There is a root of f in: [29.0000000000,29.5000000000]

There is a root of f in: [30.0000000000,30.5000000000]

There is a root of f in: [32.0000000000,32.5000000000]

There is a root of f in: [33.5000000000,34.0000000000]

There is a root of f in: [35.0000000000,35.5000000000]

There is a root of f in: [36.5000000000,37.0000000000]

There is a root of f in: [38.5000000000,39.0000000000]

There is a root of f in: [39.5000000000,40.0000000000]

There is a root of f in: [41.5000000000,42.0000000000]

There is a root of f in: [43.0000000000,43.5000000000]

There is a root of f in: [44.5000000000,45.0000000000]

There is a root of f in: [46.0000000000,46.5000000000]

------------------------------------------------------------------------------------------------------------

*Bisection*

| iter | ai | xm | bi | f(xm) | E |

| 0 | 0.0000000000 | 0.5000000000 | 1.0000000000 | -2.931087e-01 | |

| 1 | 0.5000000000 | 0.7500000000 | 1.0000000000 | -1.183964e-01 | 2.500000e-01 |

| 2 | 0.7500000000 | 0.8750000000 | 1.0000000000 | -3.681769e-02 | 1.250000e-01 |

| 3 | 0.8750000000 | 0.9375000000 | 1.0000000000 | 6.339162e-04 | 6.250000e-02 |

| 4 | 0.8750000000 | 0.9062500000 | 0.9375000000 | -1.777229e-02 | 3.125000e-02 |

| 5 | 0.9062500000 | 0.9218750000 | 0.9375000000 | -8.486582e-03 | 1.562500e-02 |

| 6 | 0.9218750000 | 0.9296875000 | 0.9375000000 | -3.905359e-03 | 7.812500e-03 |

| 7 | 0.9296875000 | 0.9335937500 | 0.9375000000 | -1.630438e-03 | 3.906250e-03 |

| 8 | 0.9335937500 | 0.9355468750 | 0.9375000000 | -4.969353e-04 | 1.953125e-03 |

| 9 | 0.9355468750 | 0.9365234375 | 0.9375000000 | 6.882244e-05 | 9.765625e-04 |

| 10 | 0.9355468750 | 0.9360351562 | 0.9365234375 | -2.139735e-04 | 4.882812e-04 |

| 11 | 0.9360351562 | 0.9362792969 | 0.9365234375 | -7.255479e-05 | 2.441406e-04 |

| 12 | 0.9362792969 | 0.9364013672 | 0.9365234375 | -1.860985e-06 | 1.220703e-04 |

| 13 | 0.9364013672 | 0.9364624023 | 0.9365234375 | 3.348203e-05 | 6.103516e-05 |

| 14 | 0.9364013672 | 0.9364318848 | 0.9364624023 | 1.581085e-05 | 3.051758e-05 |

| 15 | 0.9364013672 | 0.9364166260 | 0.9364318848 | 6.975011e-06 | 1.525879e-05 |

| 16 | 0.9364013672 | 0.9364089966 | 0.9364166260 | 2.557033e-06 | 7.629395e-06 |

| 17 | 0.9364013672 | 0.9364051819 | 0.9364089966 | 3.480293e-07 | 3.814697e-06 |

| 18 | 0.9364013672 | 0.9364032745 | 0.9364051819 | -7.564765e-07 | 1.907349e-06 |

| 19 | 0.9364032745 | 0.9364042282 | 0.9364051819 | -2.042233e-07 | 9.536743e-07 |

| 20 | 0.9364042282 | 0.9364047050 | 0.9364051819 | 7.190309e-08 | 4.768372e-07 |

| 21 | 0.9364042282 | 0.9364044666 | 0.9364047050 | -6.616008e-08 | 2.384186e-07 |

| 22 | 0.9364044666 | 0.9364045858 | 0.9364047050 | 2.871511e-09 | 1.192093e-07 |

| 23 | 0.9364044666 | 0.9364045262 | 0.9364045858 | -3.164428e-08 | 5.960464e-08 |

an approximation of the root was found in 0.9364045262336731

------------------------------------------------------------------------------------------------------------------------------

*False Rule*

| iter | ai | xm | bi | f(xm) | E |

| 0 | 0.0000000000 | 0.9339403807 | 1.0000000000 | -1.429077e-03 | |

| 1 | 0.9339403807 | 0.9365060517 | 1.0000000000 | 5.875601e-05 | 2.565671e-03 |

| 2 | 0.9339403807 | 0.9364047307 | 0.9365060517 | 8.678254e-08 | 1.013209e-04 |

| 3 | 0.9339403807 | 0.9364045811 | 0.9364047307 | 1.281543e-10 | 1.496418e-07 |

| 4 | 0.9339403807 | 0.9364045809 | 0.9364045811 | 1.890710e-13 | 2.209802e-10 |

an approximation of the root was found in 0.936404580879889

----------------------------------------------------------------------------------------------------------------------------

*Newton*

| iter | xi | f(xi) | E |

| 0 | 0.5000000000 | -2.931087e-01 | |

| 1 | 0.9283919899 | -4.662157e-03 | 4.283920e-01 |

| 2 | 0.9363667413 | -2.191262e-05 | 7.974751e-03 |

| 3 | 0.9364045800 | -4.983391e-10 | 3.783875e-05 |

| 4 | 0.9364045809 | -1.110223e-16 | 8.605719e-10 |

an approximation of the root was found in 0.936404580879562