NC Lab 3

RegulaFalsi

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S# | Function | Intervals | Tolerance | No. of Iteration | Roots |
| 1 | sqrt(x)-cos(x) | 0,1 | 0.01 | 3 | 0.64 |
| 0,1 | 0.001 | 4 | 0.642 |
| 0,1 | 0.0001 | 6 | 0.6417 |
| 2 | 3(x+1)(x-1/2)(x-1) | -2, 2' | 0.01 | 15 | -0.999 |
| -2, 2' | 0.001 | 17 | -0.9998 |
| -2, 2' | 0.0001 | 21 | -0.99998 |
| 3 | 2x cos(2x)-(x+1)^2 | -1,1 | 0.01 | 2 | 0.79 |
| -1,1 | 0.001 | 3 | 0.796 |
| -1,1 | 0.0001 | 4 | 0.7979 |

Task 1

Question m.sqrt(x)-m.cos(x)

Code

def f(x):

return m.sqrt(x)-m.cos(x)

def regulafalsi(xL,xU):

for i in range(15):

xroots = (xU\*f(xL)-xL\*f(xU))/(f(xL)-f(xU))

if f(xroots)<0:

xL=xroots

print(i,"Change in xL ",xroots)

else:

xU = xroots

print(i,"Change in xU ",xroots)

root = f(xroots)

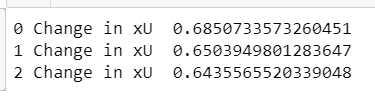
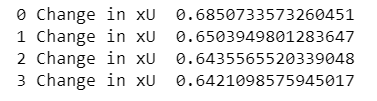
if root <= 0.01:

break

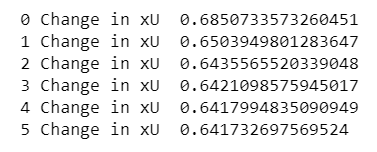
regulafalsi(0,1)

Output

Tol = 0.01 Tol = 0.001

Tol = 0.0001



Task 2

Question 3(x+1)(x-1/2)(x-1)

Code

def f(x):

return 3\*(x+1)\*((x-1)/2)\*(x-1)

def regulafalsi(xL,xU):

for i in range(15):

xroots = (xU\*f(xL)-xL\*f(xU))/(f(xL)-f(xU))

if f(xroots)<0:

xL=xroots

print(i,"Change in xL ",xroots)

else:

xU = xroots

print(i,"Change in xU ",xroots)

root = f(xroots)

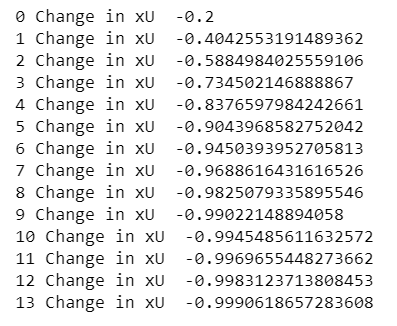
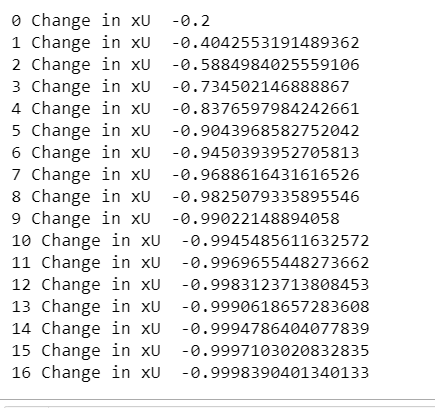
if root <= 0.01:

break

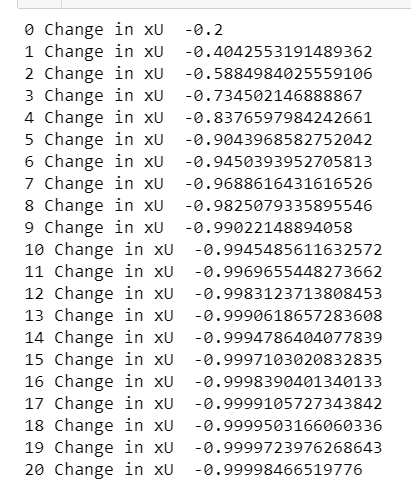
regulafalsi(-2,0)

Output

Tol = 0.01 Tol = 0.001

Tol = 0.0001



Task 3

Question 2\*x\*m.cos(2\*x)-(x+1)\*\*2

Code

def f(x):

return 2 \*x\*m.cos(2\*x) - (x +1)\*\*2

def regula\_falsi(a,b, tol=0.01):

fa= f(a)

fb= f(b)

for i in range(100):

c = (a\*f(b) - b\*f(a))/(f(b) - f(a))

fc = f(c)

if abs(fc) < tol:

return c

if fa\*fc < 0:

b = c

fb = fc

print(i,"Change in xU ",c)

else:

a = c

fa = fc

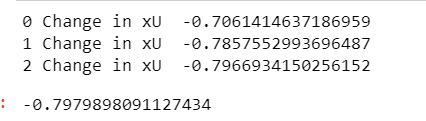
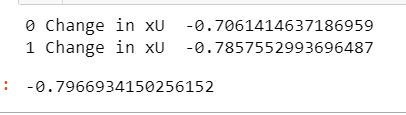
print(i,"Change in xL ",c)

return

regula\_falsi(-1,1)

Output

Tol = 0.01 Tol = 0.001



Tol = 0.0001

