**Lab Task 7**

**Numerical Computing Lab(105127)**

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Q1:

import cmath

f = lambda x:x\*\*3-2\*x-5

x0=1.9

x1=2.0

x2=2.1

x3=0

i=0

y0=(f(x0))

y1=(f(x1))

y2=(f(x2))

tol = 0.0001

print('n\t\t xn\t\t\t\tf(xn)')

print('1\t\t',x0,'\t\t',y0)

print('2\t\t',x1,'\t\t\t',y1)

print('3\t\t',x2,'\t\t',y2)

while(abs(x0-x3)>tol):

h1=x1-x0

h2=x0-x2

h=h2/h1

a=(h\*y1-y0\*(1+h)+y2)/h\*h1\*h1\*(1+h)

b=(y1-y0-(a\*h1\*\*2))/h1

c=f(x2)

x3=x0-(2\*c)/(b+cmath.sqrt(b\*\*2-4\*a\*c))

print(str(i+4)+"\t{:.4f}".format(x3)+"\t{:.4f}".format(f(x3)))

if x3.real>x0.real:

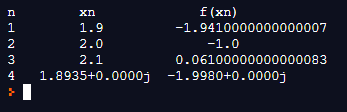
x2=x0

x0=x3

elif x3.real<x0.real:

x1=x0

x0=x3

Q2:

Q3:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S#** | **Functions** | **Starting Interval** | **Tolerance** | **No. Of Iterations** | **Root** |
| 1 | Cos(x)-1.3x = 0 | 0.001-1.5-3 | 0.01 | 1 | 3.7582+0.0000j |
| 0.001-1.5-3 | 0.001 | 1 | 3.7582+0.0000j |
| 0.001-1.5-3 | 0.0001 | 1 | 3.7582+0.0000j |
| 2 | xCos(x)-2x2+3x-1=0 | 1.1-2.1 - 2.5 | 0.01 | 1 | -1.2578-2.0498j |
| 1.1-2.1 - 2.5 | 0.001 | 1 | -1.2578-2.0498j |
| 1.1-2.1 - 2.5 | 0.0001 | 1 | -1.2578-2.0498j |
| 3 | 2xCos(2x)-(x+1)2=0 | -3-1- 4 | 0.01 | 1 | 1.0567+0.0000j |
| -3-1- 4 | 0.001 | 1 | 1.0567+0.0000j |
| -3-1- 4 | 0.0001 | 1 | 1.0567+0.0000j |