

Report - Lab 3

1. Let $f(x) = e^x - x - 1$. Use Newton's method to find the zero in $[-1, 1]$. Compare the results with those obtained using Secant method and bisection method. In all the cases compute the root up to an accuracy of 10^{-6} .

Iteration number	Newton Method	Secant Method	Bisection Method
1	0.050833	-3.099754	0
2	0.025632	-0.565287	
3	0.012871	-0.397085	
4	0.006449	-0.215138	
5	0.003228	-0.13303	
6	0.001615	-0.079946	
7	0.000808	-0.049104	
8	0.000404	-0.030111	
9	0.000202	-0.018549	
10	0.000101	-0.011434	
11	0.00005	-0.007057	
12	0.000025	-0.004358	
13	0.000013	-0.002692	
14	0.000006	-0.001663	
15	0.000003	-0.001028	
16	0.000002	-0.000635	
17	0.000001	-0.000392	
18		-0.000243	
19		-0.00015	
20		-0.000093	
21		-0.000057	
22		-0.000035	

23		-0.000022	
24		-0.000014	
25		-0.000008	
26		-0.000005	
27		-0.000003	
28		-0.000002	
29		-0.000001	

Root in each cases ~ 0

2. Let $f(x) = x - 0.8 - 0.2 \sin(x)$. Use Newton's method to find the zero in $[-1,1]$. Compare the results with those obtained using Secant method and bisection method. In all the cases compute the root up to an accuracy of 10^{-6} .

Iteration number	Newton Method	Secant Method	Bisection Method
1	0.998836	0.91672	0.785398
2	0.964445	0.967517	1.178097
3	0.964334	0.96432	0.981748
4	0.964334	0.964334	0.883573
5			0.93266
6			0.957204
7			0.969476
8			0.96334
9			0.966408
10			0.964874
11			0.964107
12			0.96449
13			0.964299
14			0.964395

Root ~ 1