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Aerodynamics and Propulsion

Q1.a Result for tol. = 1.000000e-02

iteration	convergence	value of x
1	6.00000000	7.000000
2	-2.23448276	4.765517
3	-1.41681448	3.348703
4	-0.81710312	2.531600
5	-0.35768376	2.173916
6	-0.07603220	2.097884
7	-0.00332597	2.094558

root is 2.097884

no. of function evaluation is 105

result for tol. = 1.000000e-04

iteration	convergence	value of x
1	6.00000000	7.000000
2	-2.23448276	4.765517
3	-1.41681448	3.348703
4	-0.81710312	2.531600
5	-0.35768376	2.173916
6	-0.07603220	2.097884
7	-0.00332597	2.094558
8	-0.00000623	2.094551

root is 2.094558

no. of function evaluation is 120

result for tol. = 1.000000e-05

iteration	convergence	value of x
1	6.00000000	7.000000
2	-2.23448276	4.765517
3	-1.41681448	3.348703
4	-0.81710312	2.531600
5	-0.35768376	2.173916
6	-0.07603220	2.097884

7	-0.00332597	2.094558
8	-0.00000623	2.094551

root is 2.094558

no. of function evaluation is 120

result for tol. = 1.000000e-06

iteration	convergence	value of x
1	6.00000000	7.000000
2	-2.23448276	4.765517
3	-1.41681448	3.348703
4	-0.81710312	2.531600
5	-0.35768376	2.173916
6	-0.07603220	2.097884
7	-0.00332597	2.094558
8	-0.00000623	2.094551
9	-0.00000000	2.094551

root is 2.094551

no. of function evaluation is 135

result for tol. = 1.000000e-09

iteration	convergence	value of x
1	6.00000000	7.000000
2	-2.23448276	4.765517
3	-1.41681448	3.348703
4	-0.81710312	2.531600
5	-0.35768376	2.173916
6	-0.07603220	2.097884
7	-0.00332597	2.094558
8	-0.00000623	2.094551
9	-0.00000000	2.094551

root is 2.094551

no. of function evaluation is 135

Q1.b

Result for tol. = 1.000000e-02

iteration	convergence	value of x
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1	0.11472867	1.114729
2	-0.00057155	1.114157

root is 1.114729

no. of function evaluation is 12

result for tol. = 1.000000e-04

iteration	convergence	value of x
1	0.11472867	1.114729
2	-0.00057155	1.114157
3	0.00000001	1.114157

root is 1.114157

no. of function evaluation is 18

result for tol. = 1.000000e-05

iteration	convergence	value of x
1	0.11472867	1.114729
2	-0.00057155	1.114157
3	0.00000001	1.114157

root is 1.114157

no. of function evaluation is 18

result for tol. = 1.000000e-06

iteration	convergence	value of x
1	0.11472867	1.114729
2	-0.00057155	1.114157
3	0.00000001	1.114157

root is 1.114157

no. of function evaluation is 18

result for tol. = 1.000000e-09

iteration	convergence	value of x
1	0.11472867	1.114729
2	-0.00057155	1.114157
3	0.00000001	1.114157
4	-0.00000000	1.114157

root is 1.114157

no. of function evaluation is 24

Q1.c

Result for tol. = 1.000000e-02

iteration	convergence	value of x
1	-0.46211716	0.537883
2	0.02910415	0.566987
3	0.00015629	0.567143

root is 0.566987

no. of function evaluation is 18

result for tol. = 1.000000e-04

iteration	convergence	value of x
1	-0.46211716	0.537883
2	0.02910415	0.566987
3	0.00015629	0.567143
4	0.00000000	0.567143

root is 0.567143

no. of function evaluation is 24

result for tol. = 1.000000e-05

iteration	convergence	value of x
1	-0.46211716	0.537883

2	0.02910415	0.566987
3	0.00015629	0.567143
4	0.00000000	0.567143

root is 0.567143

no. of function evaluation is 24

result for tol. = 1.000000e-06

iteration	convergence	value of x
1	-0.46211716	0.537883
2	0.02910415	0.566987
3	0.00015629	0.567143
4	0.00000000	0.567143

root is 0.567143

no. of function evaluation is 24

result for tol. = 1.000000e-09

iteration	convergence	value of x
1	-0.46211716	0.537883
2	0.02910415	0.566987
3	0.00015629	0.567143
4	0.00000000	0.567143
5	0.00000000	0.567143

root is 0.567143

no. of function evaluation is 30

Q2.(1)

result for tol. = 1.000000e-02

iteration convergence

1	0.2207792208
2	0.0714109060
3	0.0120103970
4	0.0003286636

X* is

0.8780

0.6768

1.3309

no. of function evaluation is 792

result for tol. = 1.000000e-03

iteration	convergence
1	0.2207792208
2	0.0714109060
3	0.0120103970
4	0.0003286636

X* is

0.8780

0.6768

1.3309

no. of function evaluation is 792

result for tol. = 1.000000e-04

iteration	convergence
1	0.2207792208
2	0.0714109060
3	0.0120103970
4	0.0003286636
5	0.0000002504

X* is

0.8780

0.6768

1.3309

no. of function evaluation is 990

result for tol. = 1.000000e-06

iteration	convergence
1	0.2207792208
2	0.0714109060
3	0.0120103970
4	0.0003286636
5	0.0000002504

X* is

0.8780

0.6768

1.3309

no. of function evaluation is 990

result for tol. = 1.000000e-08

iteration	convergence
1	0.2207792208
2	0.0714109060
3	0.0120103970
4	0.0003286636
5	0.0000002504
6	0.0000000000

X* is

0.8780

0.6768

1.3309

no. of function evaluation is 1188

Q2(2). ‘This problem is not converging because we are getting singular jacobi matrix.’