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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

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.’