AD3.

(1) Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: -0.7

Enter guess 1 at root: -0.6

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=-0.700000, error=0.033333333

Guess 1: x=-0.600000, error=0.066666667

Iter 1: x= -0.739355228845, dx= -0.139355228845, error = 0.072688562178

Iter 2: x= -0.244756091134, dx= 0.49459913771, error = 0.421910575532

Iter 3: x= -0.781752933041, dx= -0.536996841906, error = 0.115086266374

Iter 4: x= -0.919521337282, dx= -0.137768404241, error = 0.252854670615

Iter 5: x= -0.747503957809, dx= 0.172017379473, error = 0.0808372911424

Iter 6: x= -0.729267243579, dx= 0.0182367142301, error = 0.0626005769122

Iter 7: x= -0.702954088325, dx= 0.0263131552541, error = 0.0362874216581

Iter 8: x= -0.690118585872, dx= 0.012835502453, error = 0.0234519192051

Iter 9: x= -0.681115466062, dx= 0.0090031198097, error = 0.0144487993954

Iter 10: x= -0.675691471317, dx= 0.00542399474555, error = 0.00902480464987

Iter 11: x= -0.672255360724, dx= 0.00343611059301, error = 0.00558869405686

Iter 12: x= -0.67013129281, dx= 0.00212406791363, error = 0.00346462614323

Iter 13: x= -0.668810556572, dx= 0.00132073623758, error = 0.00214388990565

Iter 14: x= -0.667993029519, dx= 0.000817527053141, error = 0.00132636285251

Iter 15: x= -0.667486845954, dx= 0.0005061835654, error = 0.000820179287109

Iter 16: x= -0.667173754314, dx= 0.000313091639443, error = 0.000507087647665

Iter 17: x= -0.666980131792, dx= 0.000193622522347, error = 0.000313465125318

Iter 18: x= -0.666860425762, dx= 0.000119706030355, error = 0.000193759094963

Iter 19: x= -0.666786426435, dx= 7.39993267488e-05, error = 0.000119759768214

Iter 20: x= -0.66674068618, dx= 4.5740254922e-05, error = 7.40195132918e-05

Iter 21: x= -0.66671241472, dx= 2.82714602626e-05, error = 4.57480530291e-05

Iter 22: x= -0.666694941086, dx= 1.74736334492e-05, error = 2.827441958e-05

Iter 23: x= -0.666684141436, dx= 1.07996500859e-05, error = 1.74747694941e-05

Iter 24: x= -0.666677466749, dx= 6.67468677522e-06, error = 1.08000827189e-05

Iter 25: x= -0.666673341516, dx= 4.12523362963e-06, error = 6.67484908934e-06

Iter 26: x= -0.666670791966, dx= 2.5495500089e-06, error = 4.12529908045e-06

Iter 27: x= -0.666669216243, dx= 1.57572234975e-06, error = 2.54957673074e-06

Iter 28: x= -0.666668242395, dx= 9.73848847165e-07, error = 1.57572788362e-06

Iter 29: x= -0.666667640528, dx= 6.01866935462e-07, error = 9.73860948106e-07

Iter 30: x= -0.666667268574, dx= 3.7195409363e-07, error = 6.01906854469e-07

The root is -0.666667

The number of iterations is 30

errors = [3.33333333e-02 6.66666667e-02 7.26885622e-02 4.21910576e-01

1.15086266e-01 2.52854671e-01 8.08372911e-02 6.26005769e-02

3.62874217e-02 2.34519192e-02 1.44487994e-02 9.02480465e-03

5.58869406e-03 3.46462614e-03 2.14388991e-03 1.32636285e-03

8.20179287e-04 5.07087648e-04 3.13465125e-04 1.93759095e-04

1.19759768e-04 7.40195133e-05 4.57480530e-05 2.82744196e-05

1.74747695e-05 1.08000827e-05 6.67484909e-06 4.12529908e-06

2.54957673e-06 1.57572788e-06 9.73860948e-07 6.01906854e-07]

Linear error ratios (r\_l): [0. 5.8043599 0.27277407 2.19708814 0.31969863 0.77440221

0.57966593 0.64628232 0.61610307 0.62460585 0.61925928 0.61993484

0.61879401 0.61867116 0.6183672 0.61826439 0.61816754 0.6181201

0.61808592 0.6180666 0.61805396 0.6180464 0.61804167 0.61803864

0.61803685 0.61803631 0.6180344 0.61803509 0.61803879 0.61806242]

Superlinear error ratios (r\_sl): [0.00000000e+00 3.75264093e+00 5.20747349e+00 2.77790424e+00

3.06263755e+00 7.17077381e+00 1.03239036e+01 1.69784195e+01

2.66334642e+01 4.28588747e+01 6.86923276e+01 1.10722470e+02

1.78567942e+02 2.88432350e+02 4.66135183e+02 7.53698067e+02

1.21896107e+03 1.97178528e+03 3.18987145e+03 5.16078117e+03

8.34977663e+03 1.35096825e+04 2.18585791e+04 3.53673820e+04

5.72251457e+04 9.25915162e+04 1.49815826e+05 2.42408388e+05

3.92239311e+05]

Process finished with exit code 0

(2) Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: 0.4

Enter guess 1 at root: 0.6

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=0.400000, error=0.1

Guess 1: x=0.600000, error=0.1

Iter 1: x= 0.459531456858, dx= -0.140468543142, error = 0.0404685431417

Iter 2: x= 0.486550989519, dx= 0.027019532661, error = 0.0134490104806

Iter 3: x= 0.502859623441, dx= 0.0163086339218, error = 0.00285962344122

Iter 4: x= 0.499833158272, dx= -0.00302646516942, error = 0.000166841728199

Iter 5: x= 0.499998036691, dx= 0.000164878419148, error = 1.96330905095e-06

Iter 6: x= 0.500000001363, dx= 1.96467219806e-06, error = 1.36314715071e-09

Iter 7: x= 0.5, dx= -1.36315826244e-09, error = 1.11022302463e-14

The root is 0.500000

The number of iterations is 7

errors = [1.00000000e-01 1.00000000e-01 4.04685431e-02 1.34490105e-02

2.85962344e-03 1.66841728e-04 1.96330905e-06 1.36314715e-09

1.11022302e-14]

Linear error ratios (r\_l): [0.00000000e+00 3.32332460e-01 2.12627051e-01 5.83439504e-02

1.17674941e-02 6.94311041e-04 8.14455742e-06]

Superlinear error ratios (r\_sl): [0. 5.2541316 4.33815934 4.11505023 4.16149514 4.14838276]

Process finished with exit code 0

(3) Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: -1.5

Enter guess 1 at root: -1.2

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=-1.500000, error=0.11870152

Guess 1: x=-1.200000, error=0.18129848

Iter 1: x= -1.28403005813, dx= -0.084030058125, error = 0.097268421875

Iter 2: x= -1.68801741129, dx= -0.403987353163, error = 0.306718931288

Iter 3: x= -1.30827030144, dx= 0.379747109848, error = 0.0730281785602

Iter 4: x= -1.32767301043, dx= -0.0194027089918, error = 0.0536254695684

Iter 5: x= -1.40730890642, dx= -0.0796358959836, error = 0.0260104264152

Iter 6: x= -1.37480149781, dx= 0.0325074086041, error = 0.00649698218894

Iter 7: x= -1.38060120375, dx= -0.00579970593492, error = 0.000697276254018

Iter 8: x= -1.38131858811, dx= -0.00071738436135, error = 2.01081073321e-05

Iter 9: x= -1.38129842092, dx= 2.01671824004e-05, error = 5.90750681706e-08

Iter 10: x= -1.38129848204, dx= -6.11137155765e-08, error = 2.03864747306e-09

The root is -1.381298

The number of iterations is 10

errors = [1.18701520e-01 1.81298480e-01 9.72684219e-02 3.06718931e-01

7.30281786e-02 5.36254696e-02 2.60104264e-02 6.49698219e-03

6.97276254e-04 2.01081073e-05 5.90750682e-08 2.03864747e-09]

Linear error ratios (r\_l): [0.00000000e+00 3.15332484e+00 2.38094787e-01 7.34312023e-01

4.85038670e-01 2.49783763e-01 1.07323098e-01 2.88380785e-02

2.93787313e-03 3.45094392e-02]

Superlinear error ratios (r\_sl): [ 0. 2.44781176 2.39408771 6.64180155 4.65793148

4.12615679 4.43868825 4.21335606 1716.19529508]

Process finished with exit code 0

(4) Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: 0

Enter guess 1 at root: 0.4

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=0.000000, error=0.20518292

Guess 1: x=0.400000, error=0.19481708

Iter 1: x= 0.282946262846, dx= -0.117053737154, error = 0.0777633428458

Iter 2: x= -0.0472994574607, dx= -0.330245720307, error = 0.252482377461

Iter 3: x= 0.214484562718, dx= 0.261784020179, error = 0.00930164271826

Iter 4: x= 0.205247527758, dx= -0.00923703495994, error = 6.46077583252e-05

Iter 5: x= 0.205181973245, dx= -6.55545135619e-05, error = 9.4675523668e-07

Iter 6: x= 0.205182924781, dx= 9.51536369278e-07, error = 4.78113260094e-09

Iter 7: x= 0.205182924689, dx= -9.20848496959e-11, error = 4.68904776119e-09

The root is 0.205183

The number of iterations is 7

errors = [2.05182920e-01 1.94817080e-01 7.77633428e-02 2.52482377e-01

9.30164272e-03 6.46077583e-05 9.46755237e-07 4.78113260e-09

4.68904776e-09]

Linear error ratios (r\_l): [0. 3.24680458 0.03684076 0.00694584 0.01465389 0.00505002

0.98073995]

Superlinear error ratios (r\_sl): [0.00000000e+00 4.73754842e-01 2.75102127e-02 1.57540924e+00

7.81642923e+01 1.03589599e+06]

Process finished with exit code 0

(5) Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: 1

Enter guess 1 at root: 1.3

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=1.000000, error=0.17611556

Guess 1: x=1.300000, error=0.12388444

Iter 1: x= 1.08744893682, dx= -0.212551063183, error = 0.0886666231832

Iter 2: x= 1.13777435766, dx= 0.0503254208458, error = 0.0383412023374

Iter 3: x= 1.19586927308, dx= 0.0580949154154, error = 0.019753713078

Iter 4: x= 1.1729641998, dx= -0.0229050732807, error = 0.00315136020269

Iter 5: x= 1.17587747199, dx= 0.00291327219296, error = 0.000238088009736

Iter 6: x= 1.17611857296, dx= 0.000241100965754, error = 3.01295601846e-06

Iter 7: x= 1.17611555449, dx= -3.01846408409e-06, error = 5.50806555921e-09

Iter 8: x= 1.17611555735, dx= 2.862978338e-09, error = 2.64508726033e-09

The root is 1.176116

The number of iterations is 8

errors = [1.76115560e-01 1.23884440e-01 8.86666232e-02 3.83412023e-02

1.97537131e-02 3.15136020e-03 2.38088010e-04 3.01295602e-06

5.50806556e-09 2.64508726e-09]

Linear error ratios (r\_l): [0. 0.43241979 0.51520849 0.15953255 0.07555087 0.0126548

0.00182813 0.48022073]

Superlinear error ratios (r\_sl): [0.00000000e+00 5.81062495e+00 4.16086454e+00 3.82464153e+00

4.01566265e+00 7.67836555e+00 1.59385244e+05]

Process finished with exit code 0

AD4

Solve the problem f(x)=0 using Secant method

Enter guess 0 at root: 0.02

Enter guess 1 at root: 0.09

Enter tolerance: 5e-7

Enter maxIteration: 100

Monitor iterations? (1/0): 1

Guess 0: x=0.020000, error=0.034718

Guess 1: x=0.090000, error=0.035282

Iter 1: x= 0.0538602991383, dx= -0.0361397008617, error = 0.000857700861691

Iter 2: x= 0.0546976462744, dx= 0.000837347136046, error = 2.03537256449e-05

Iter 3: x= 0.0547179372187, dx= 2.02909443049e-05, error = 6.27813400225e-08

Iter 4: x= 0.0547179250234, dx= -1.2195296535e-08, error = 7.4976636559e-08

The root is 0.054718

The number of iterations is 4

errors = [3.47180000e-02 3.52820000e-02 8.57700862e-04 2.03537256e-05

6.27813400e-08 7.49766366e-08]

Linear error ratios (r\_l): [0. 0.02373056 0.00308451 1.19425034]

Superlinear error ratios (r\_sl): [0.00000000e+00 3.59625781e+00 5.86747782e+04]

Process finished with exit code 0