Line Search Minimization

GitHub Repo: https://github.com/liavcol/
LineSearchMinimization

Quadratic Circle

Gradient Descent Results:
Iterations: 3
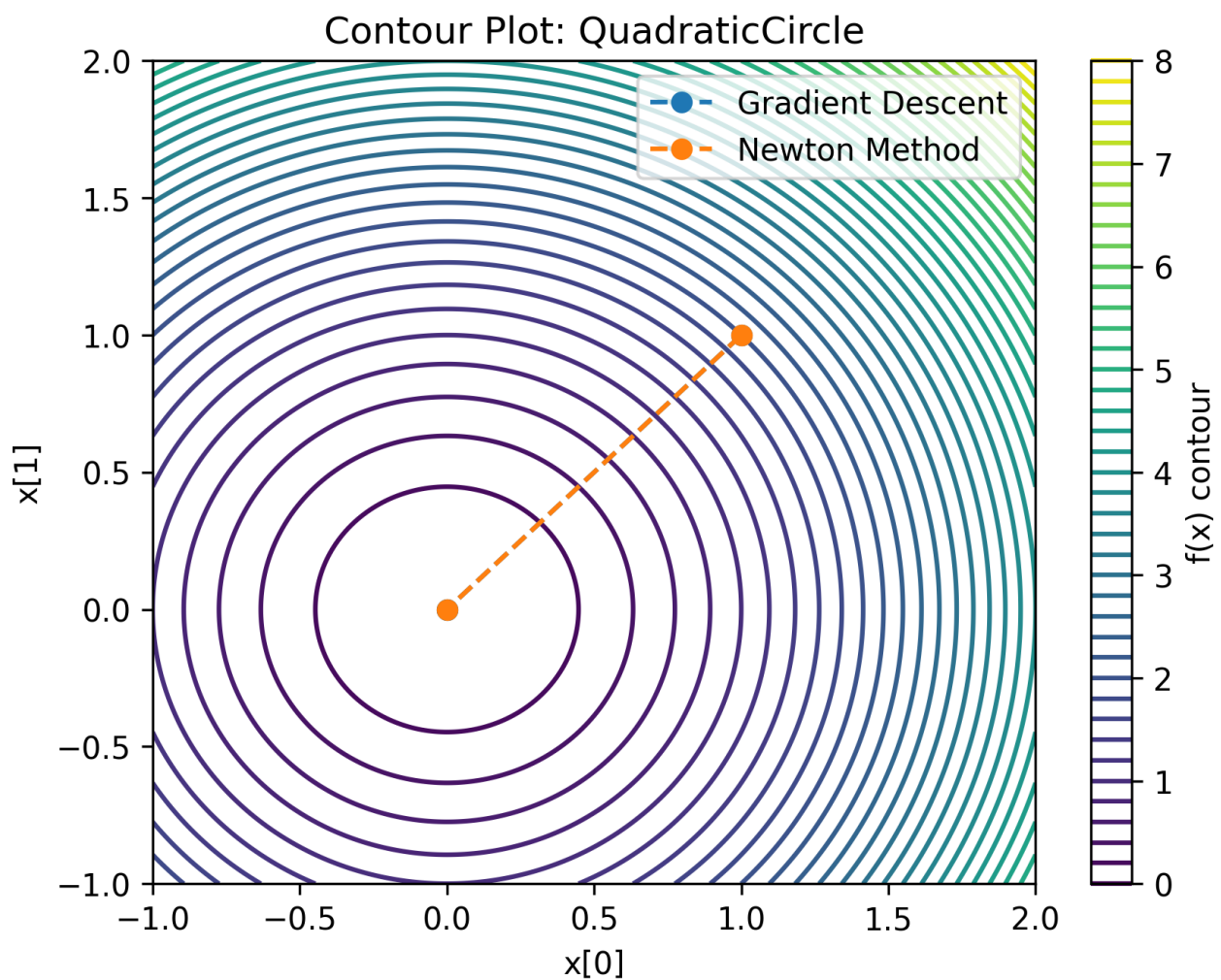Final point: [0. 0.]
Final objective value: 0.0
Success: True
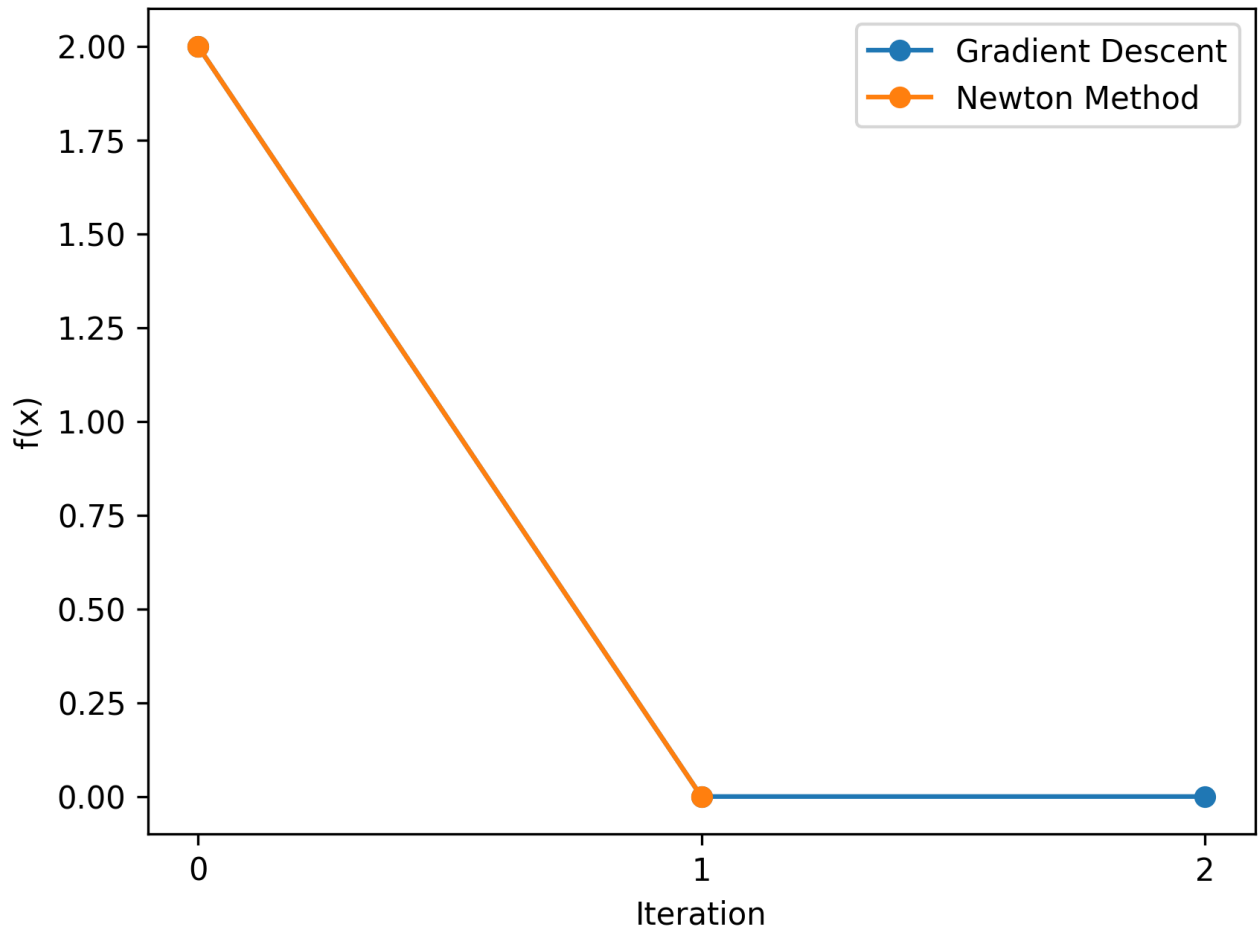---
Newton Method Results:
Iterations: 2
Final point: [0. 0.]
Final objective value: 0.0
Success: True

Contour Plot: QuadraticCircle

Objective value vs. iteration: QuadraticCircle

Quadratic Ellipse

Gradient Descent Results:
Iterations: 101
Final point: [0.11271997 0.0008856]
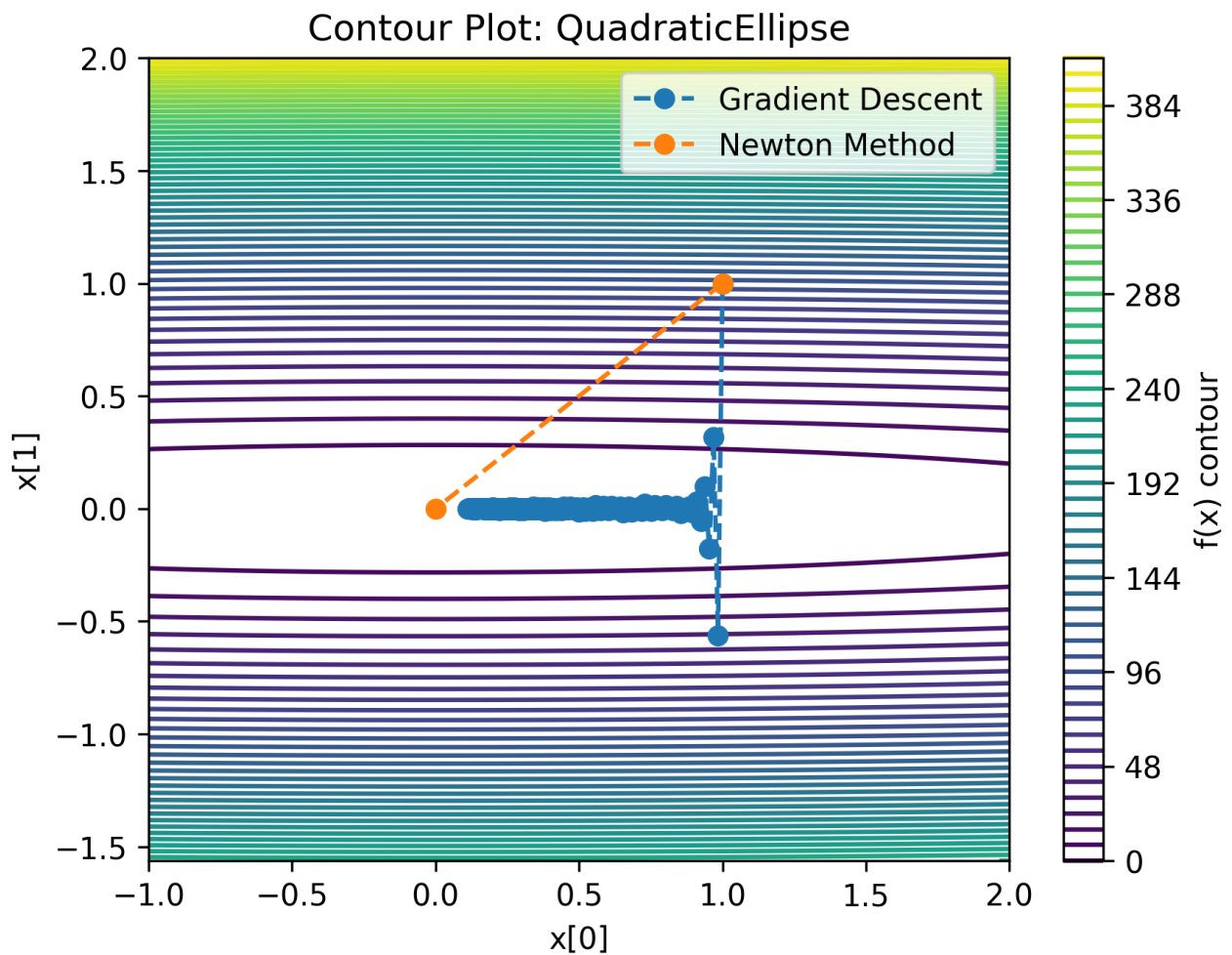Final objective value: 0.012784220095399295
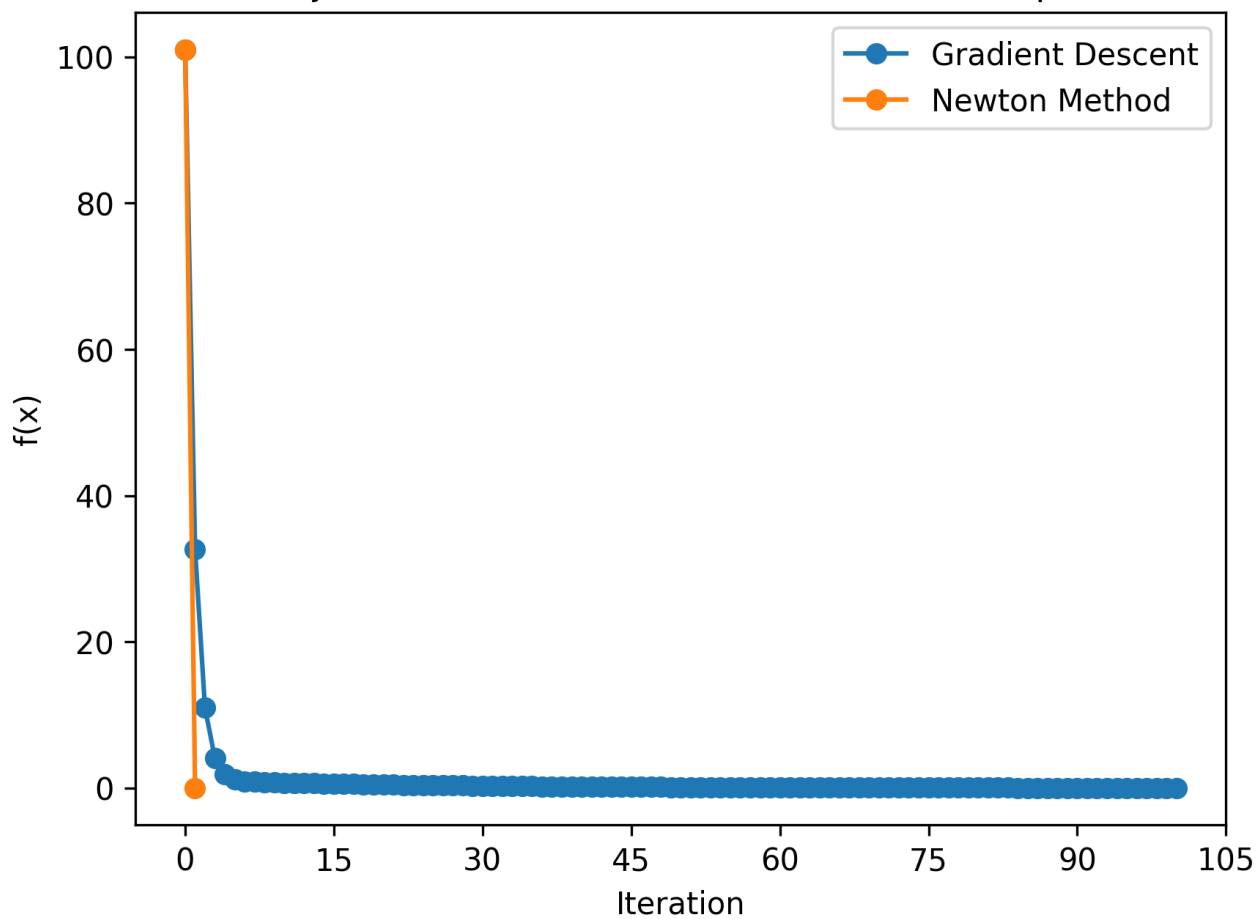Success: False
---
Newton Method Results:
Iterations: 2
Final point: [0. 0.]
Final objective value: 0.0
Success: True

Contour Plot: QuadraticEllipse

Objective value vs. iteration: QuadraticEllipse

Quadratic Rotated Ellipse

Gradient Descent Results:
Iterations: 101
Final point: [0.07682763 0.13062022]
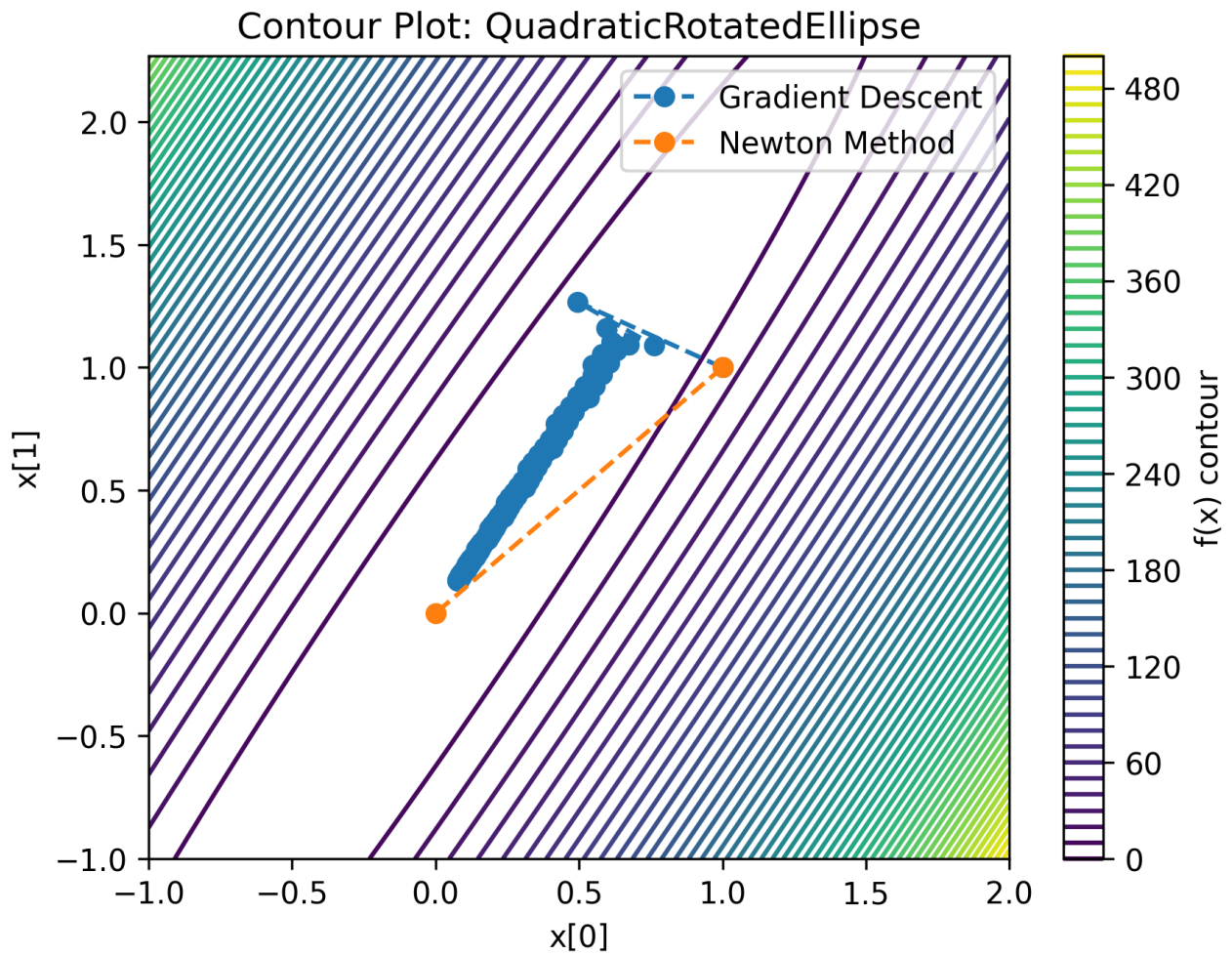Final objective value: 0.02311258419270041
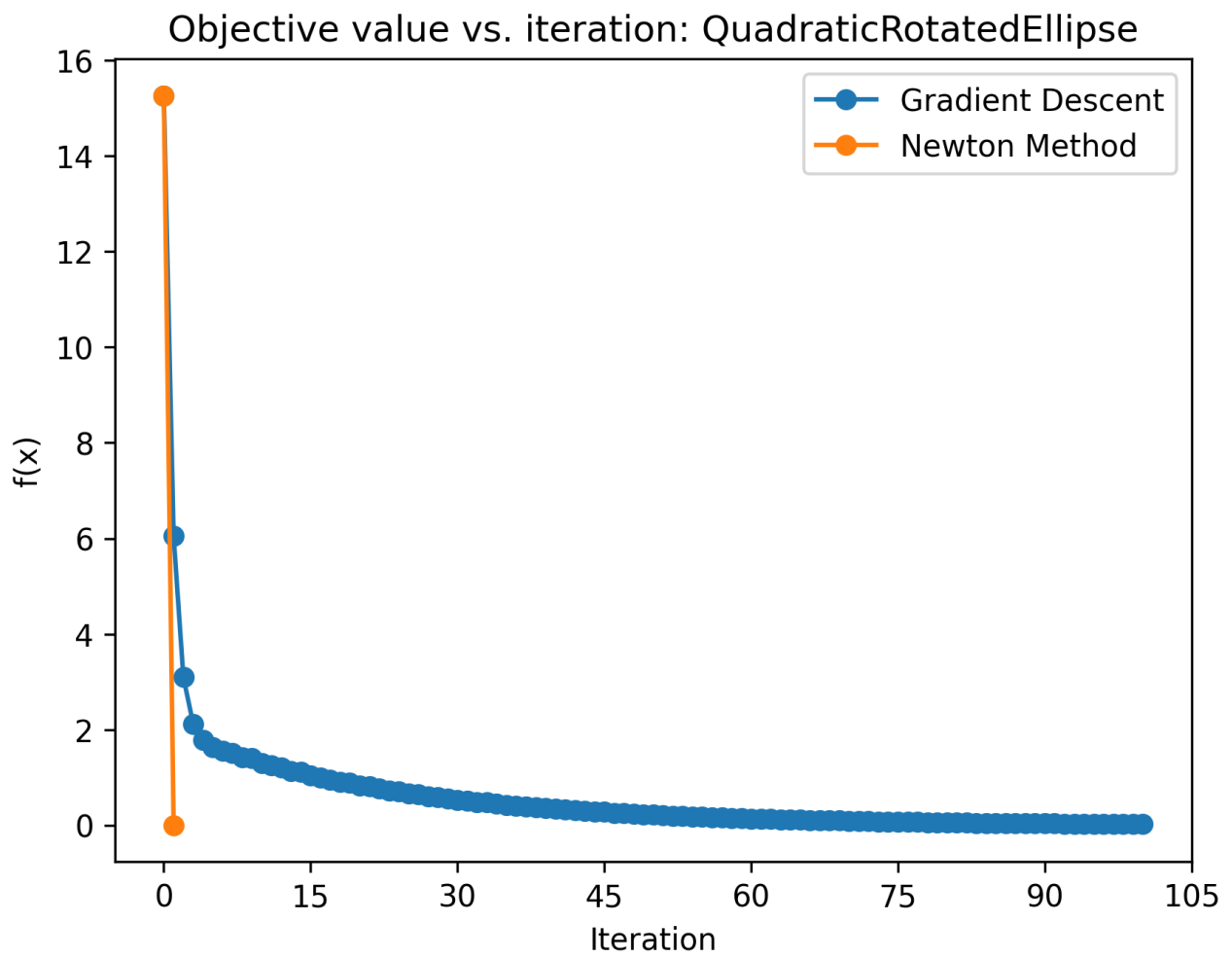Success: False
---
Newton Method Results:
Iterations: 2
Final point: [0.00000000e+00 1.11022302e-16]
Final objective value: 3.1739325483501647e-31
Success: True

Contour Plot: QuadraticRotatedEllipse

Objective value vs. iteration: QuadraticRotatedEllipse

Rosenbrock

Gradient Descent Results:
Iterations: 6501
Final point: [0.99970701 0.99941465]
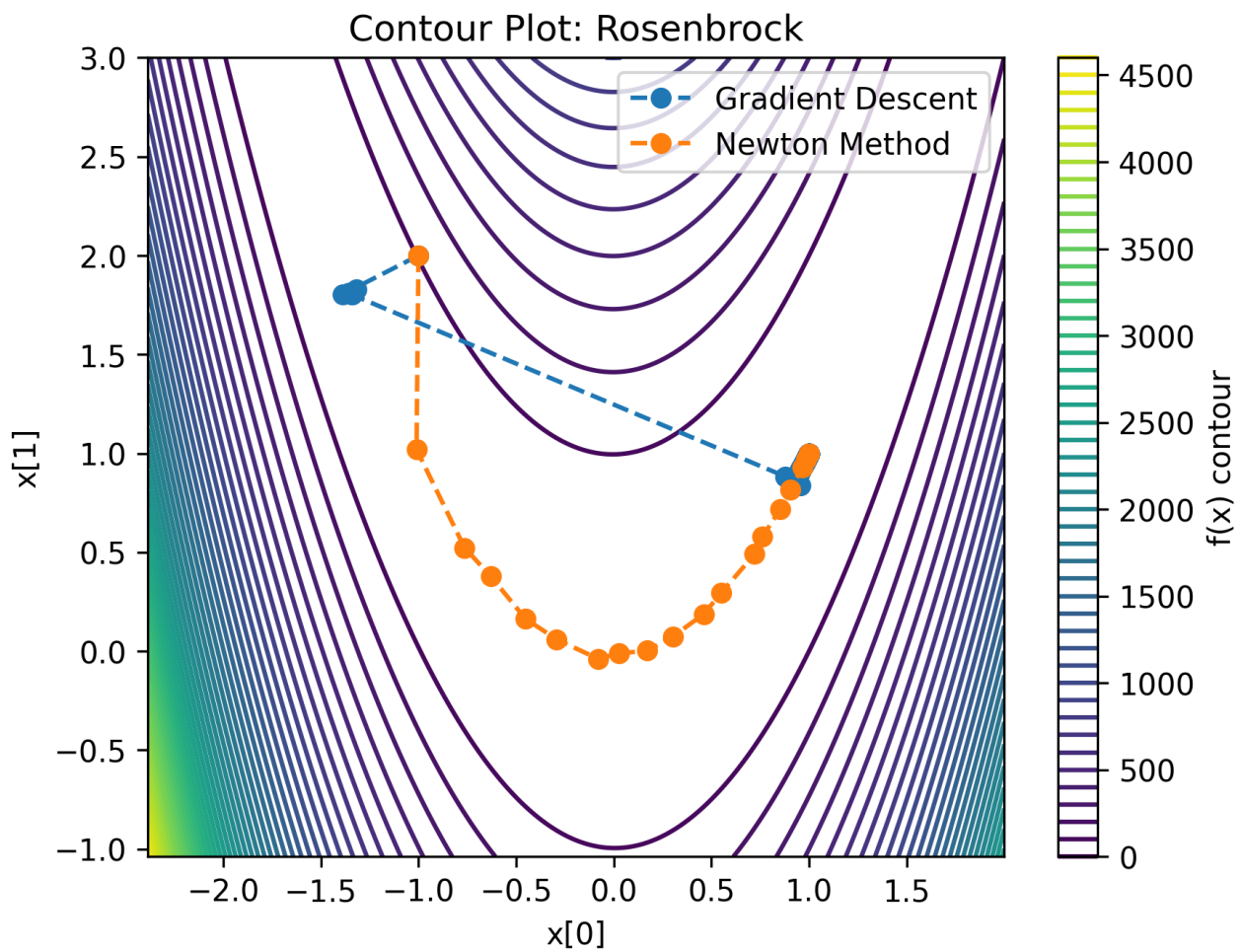Final objective value: 8.587653457730636e-08
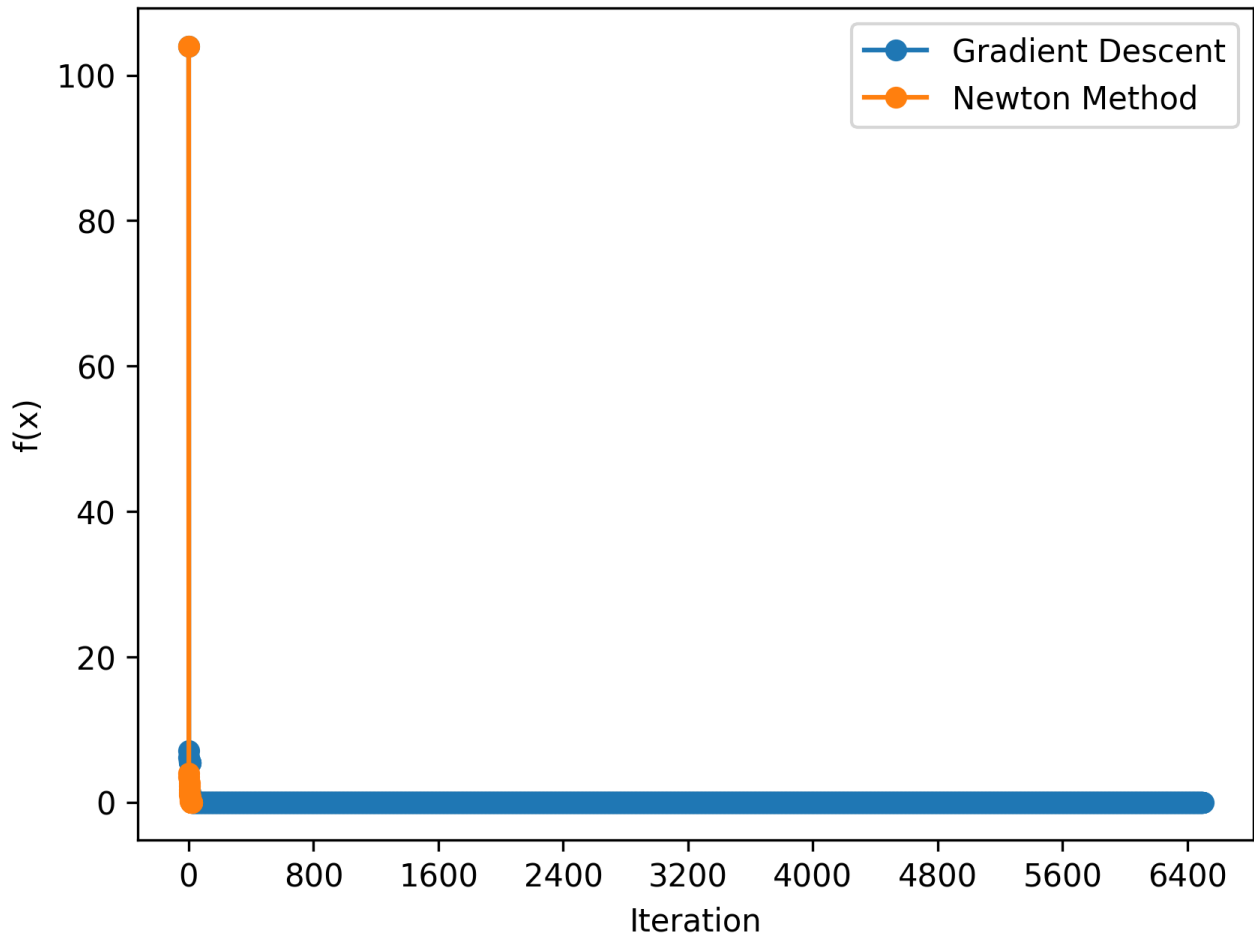Success: True
---
Newton Method Results:
Iterations: 21
Final point: [0.99999999 0.99999998]
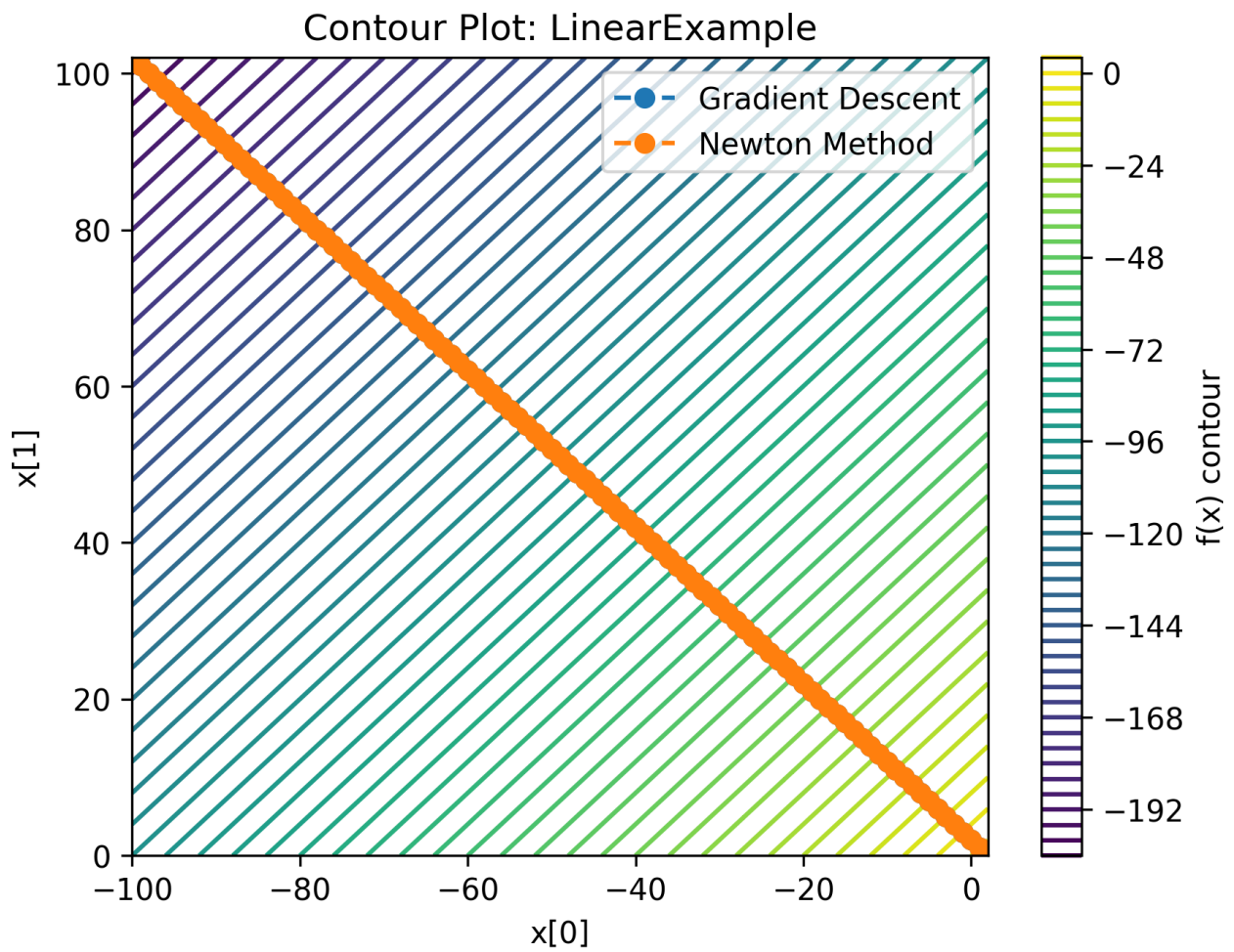Final objective value: 2.730096593566043e-16
Success: True

Contour Plot: Rosenbrock

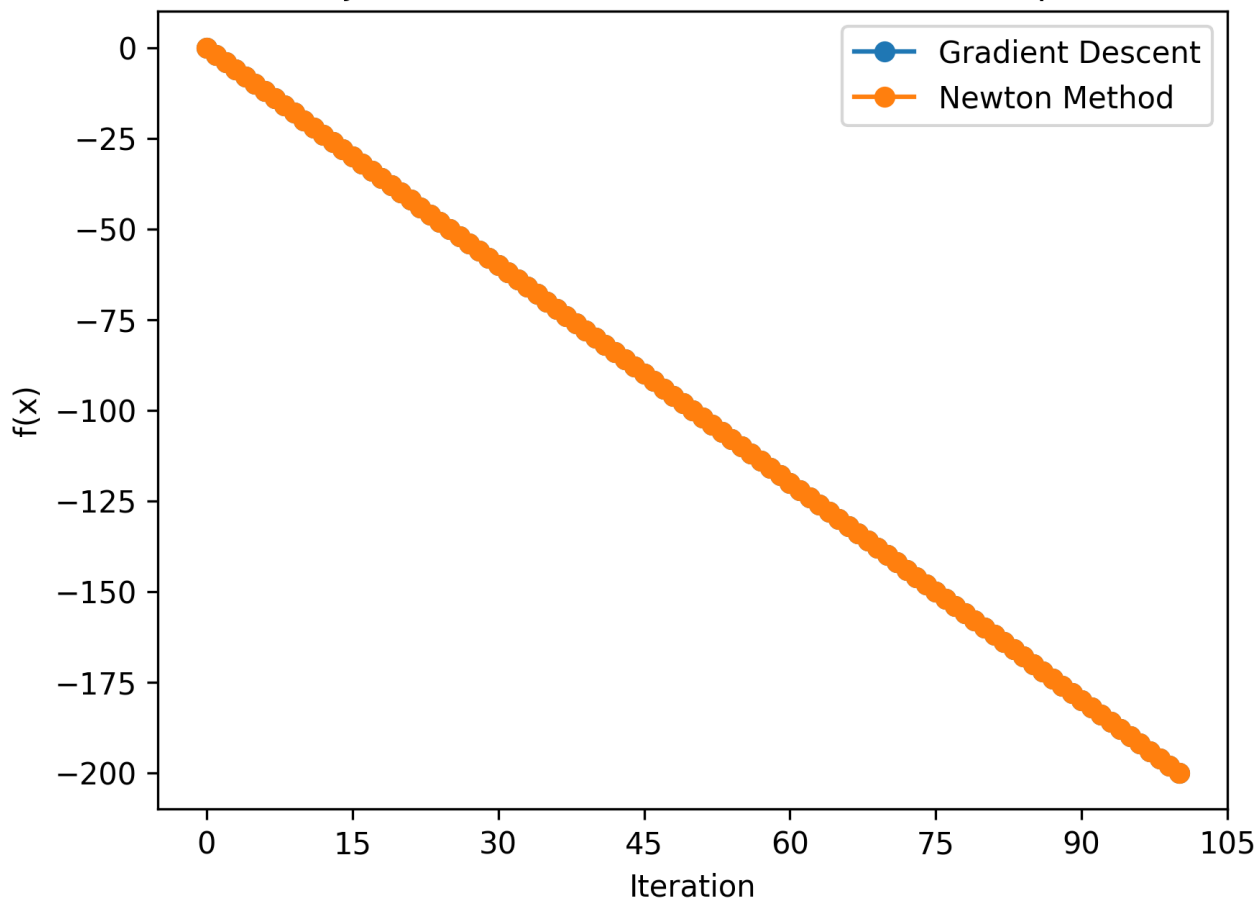Objective value vs. iteration: Rosenbrock

Linear Example

Iterations: 101
Final point: [-99 101]
Final objective value: -200
Success: False

Newton Method Results:
Iterations: 101
Final point: [-99 101]
Final objective value: -200
Success: False

Contour Plot: LinearExample

Objective value vs. iteration: LinearExample

Smoothed Corner Triangle

Gradient Descent Results:
Iterations: 30
Final point: [-3.46572886e-01 -9.76799665e-07]
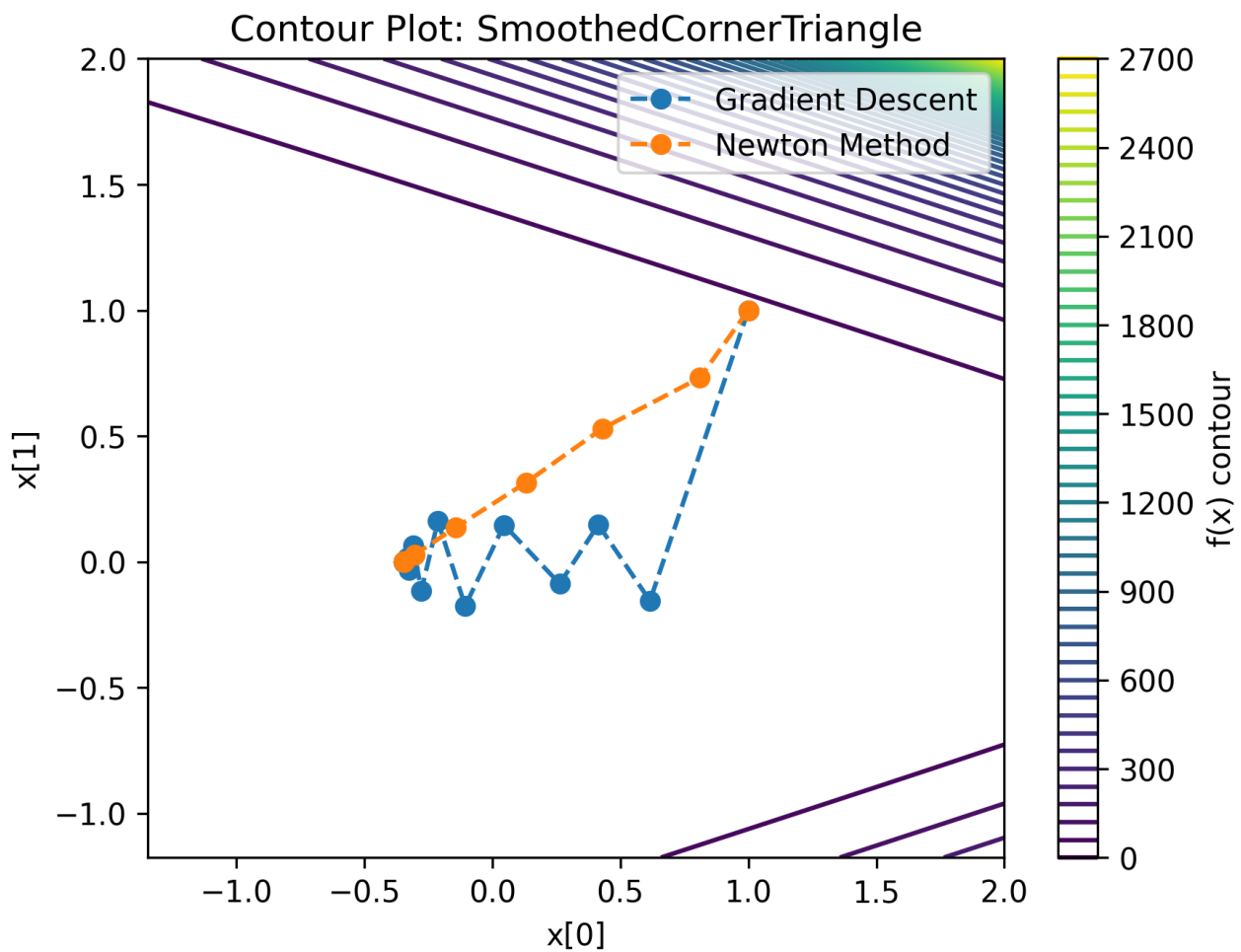Final objective value: 2.559266696664345
Success: True

Newton Method Results:
Iterations: 9
Final point: [-3.4657359e-01 6.8068820e-12]
Final objective value: 2.5592666966582156
Success: True

Contour Plot: SmoothedCornerTriangle

Objective value vs. iteration: SmoothedCornerTriangle