

# Numerical Optimization with Python - HW3

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## 1 Circles

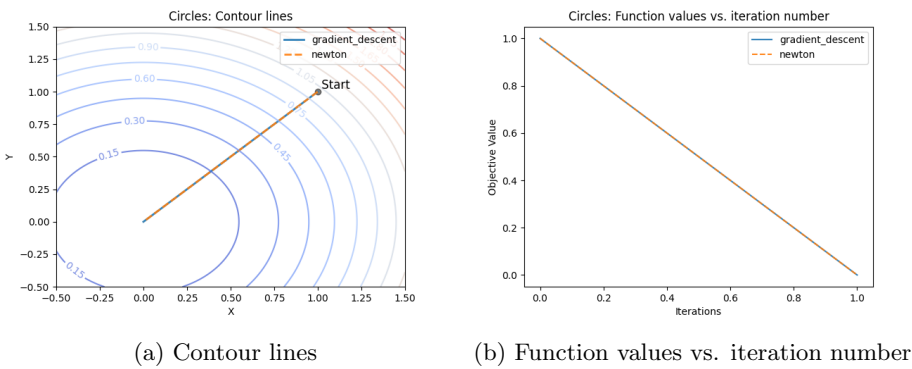


Figure 1: Circles plots

### Last Iteration Report:

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(0, 0)	0	True
Newton	(0, 0)	0	True

## 2 Ellipses

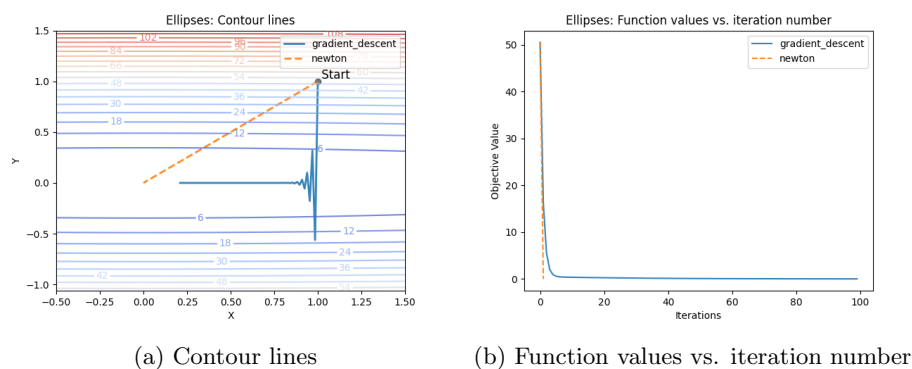


Figure 2: Ellipses plots

**Last Iteration Report:**

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(0.207, 0.0)	0.022	False
Newton	(0.0, 0.0)	0.0	True

## 3 Rotated Ellipses

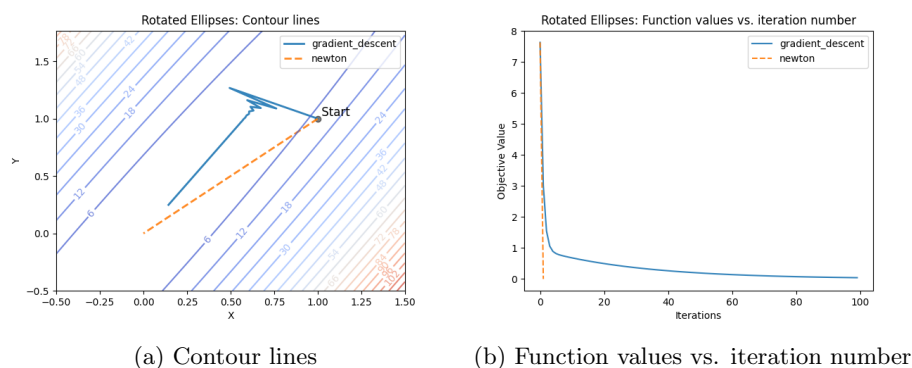
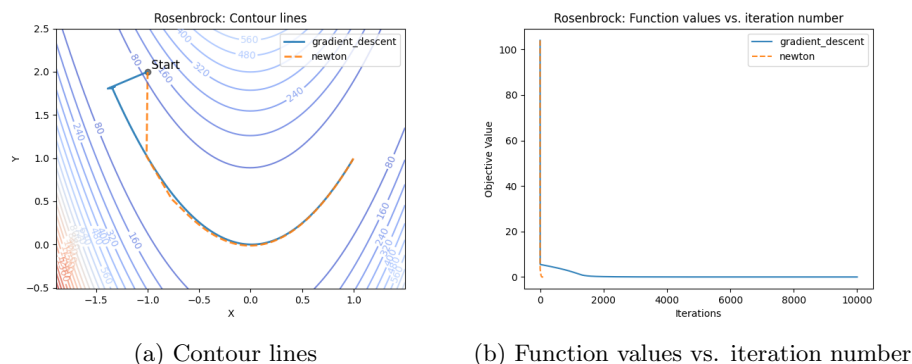


Figure 3: Rotated Ellipses plots

**Last Iteration Report:**

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(0.141, 0.245)	0.041	False
Newton	(0.0, 0.0)	0.0	True

## 4 Rosenbrock



(a) Contour lines

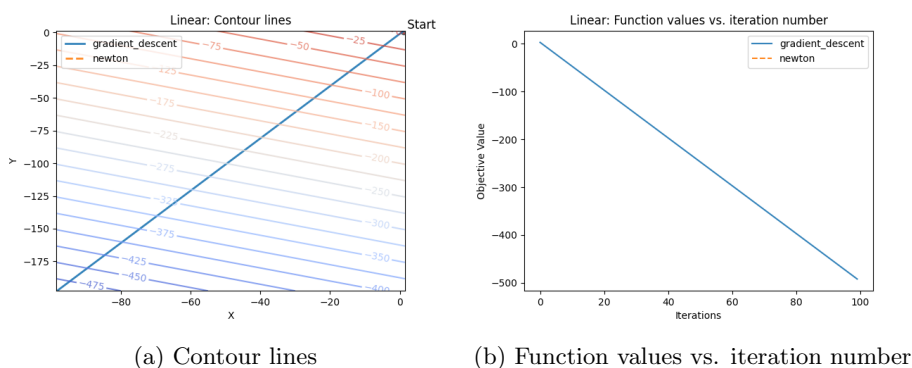
(b) Function values vs. iteration number

Figure 4: Rosenbrock plots

### Last Iteration Report:

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(0.99, 0.98)	0.0	False
Newton	(0.999, 0.997)	0.0	False

## 5 Linear



(a) Contour lines

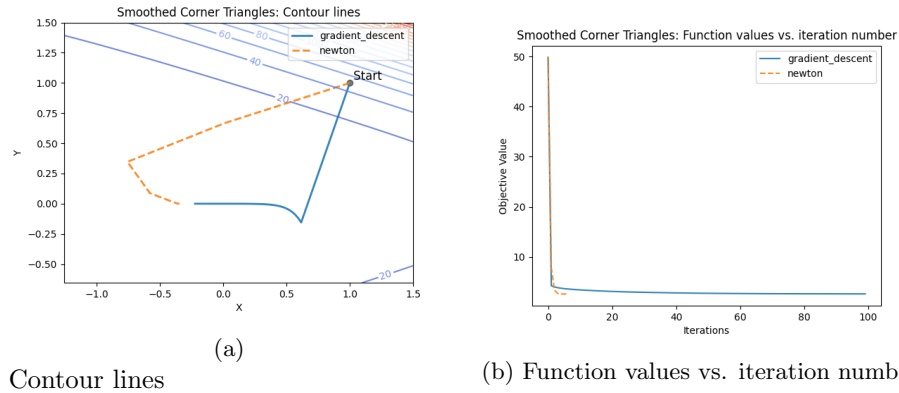
(b) Function values vs. iteration number

Figure 5: Linear plots

### Last Iteration Report:

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(-99.0, -199.0)	-492.0	False
Newton	(1, 1)	3	True

## 6 Smoothed Corner Triangles



Contour lines

(b) Function values vs. iteration number

Figure 6: Smoothed Corner Triangles plots

### Last Iteration Report:

Algorithm	(x, y)	f(x, y)	Success
Gradient Descent	(-0.226, 0.0)	2.579	False
Newton	(-0.347, 0.0)	2.559	True