1 Exercise 1

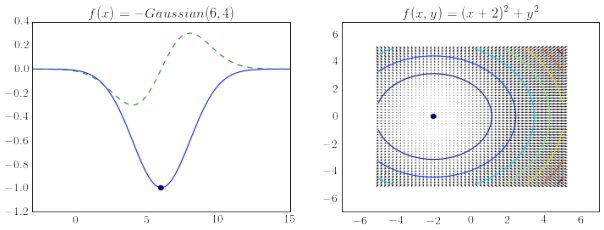

Figure 1: (a) Convex function with known minimum value and it's analytical derivative. The dots are the calculated minima according to gradient descent. (b) Contour plot of the gradient of a scalar function with vector-valued arguments. The dots are the calculated minima according to gradient descent.

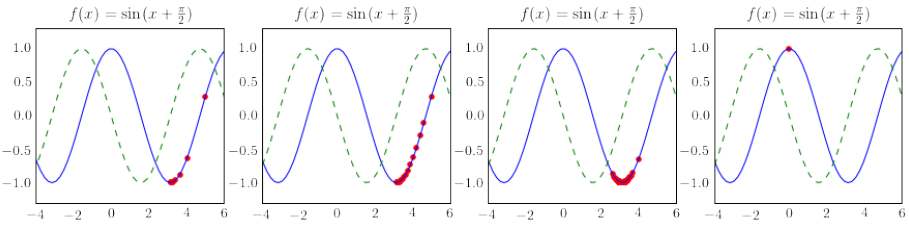

Figure 2: The solid line is the function, the dashed line is it's analytical derivative, and the series of dots is the series of minimum guesses from gradient descent. (a) Initial guess: 5, step: 0.5, threshold: 0.1 converges in 9 iterations. (b) Initial guess: 5, step: 0.2, threshold: 0.1 converges in 20 iterations. (c) Initial guess: 4, step: 2, threshold: 0.1 converges in 59992 iterations. (d) Initial guess: 0, step: 0.5, threshold: 0.1 converges in 1 iteration, but does not converge to the correct minimum.

2 Exercise 2

This is a test.

3 Exercise 3

This is a test.

4 Exercise 4

This is a test.