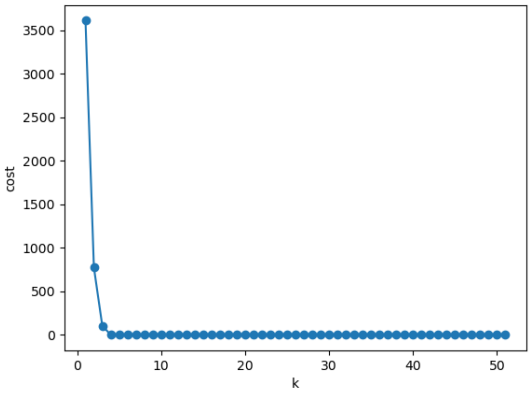
Andrew Hall
CS589 HW1 Report

Task 1:

Random Search on $c(w) = w^2$ starting from $w = -2$ with $K = 5$ and $P = 5$
Weight History: [-2, -1, 0, 0, 0, 0]
Cost History: [4, 1, 0, 0, 0, 0]

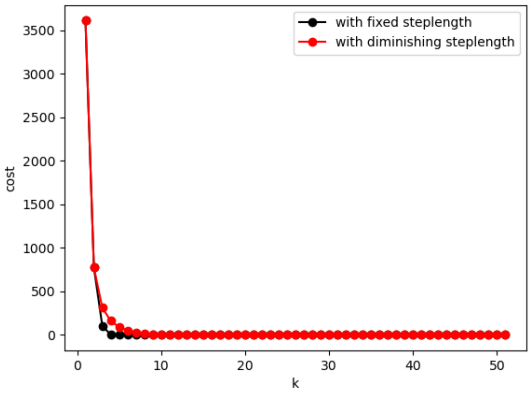
Task 2:

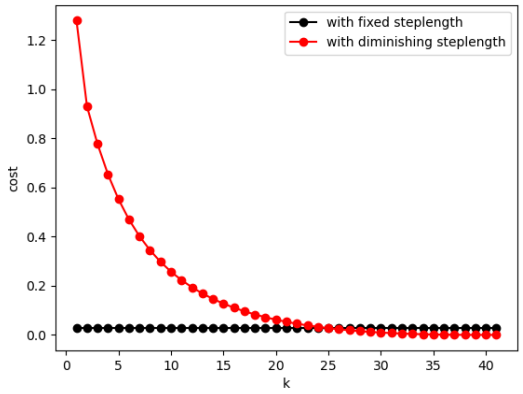


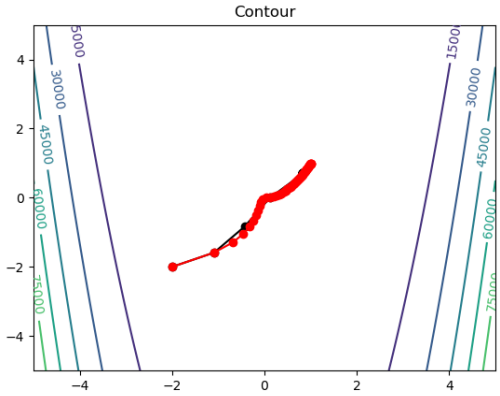
Random Search on
$c(w0, w1) = 100 \cdot (w_1 - w_0^2)^2 + (w_0 - 1)^2$
Initial $w = (-2, -2)$
$K = 50$
$P = 1000$
$a = 1$

Task 3:

Random Search on $c(w0, w1) = 100 \cdot (w_1 - w_0^2)^2 + (w_0 - 1)^2$ starting from $w = (-2, -2)$ with $K = 50$ and $P = 1000$
Final Cost ($a = 1$): 0.028663876907508132
Final Cost ($a = 1/k$): 3.0852400842917014e-05 (~1000x better, but slower to converge)
Left: full cost history, Right: cost history from the 10th iteration







←The cost function has a true global minimum at $w^* = (1, 1)$