

Q1.)

Let the three (x_i, y_i) points be $\{ (1, 4), (2, 4), (3, 8) \}$. We want to fit the best possible linear map between x and y . Let it be $y = mx + b$. Let the error be $\sum_i (y_i - (mx_i + b))^2$

. (i) Starting from the initial solution $(m, b) = (0, 1)$, find the next solution as per the gradient descent method with $\eta = 0.01$, (ii) Starting from the initial solution $(m, b) = (1, 1)$ find the next solution using the Newton's descent method.

Q2.)

Let three cities are located in a map at coordinates $(1, 5)$, $(1, 1)$ and $(4, 6)$. You are asked to find the location of an airport which will be at the "least sum of squared distances" from these cities. Assuming, you chose your initial random solution to be $(0,0)$,

(a) apply *gradient descent* procedure with step size 0.1 for three iterations, and

(b) apply *Newton's descent* method.