COMP 4190 Assignment 1 Answer

Fidelio Ciandy, 7934456

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

(a) $\nabla_x f(x) = \frac{1}{2}(A + A^T)x - b$

(b) $x^* : \nabla f(x^*) = 0$

$\frac{1}{2}(A + A^T)x^* - b = 0$

$\frac{1}{2}(A + A^T)x^* = b$

$(A + A^T)x^* = 2b$

$x^* = \dfrac{2b}{(A + A^T)}$

(c)

Problem 7

(a) $\nabla f(x) = 2(x - 2)$

(b) $x_k + 1 = x_k - \alpha \nabla f(X_k)$

$x_k + 1 = x_k - \alpha 2(x - 2)$

(c) $x^* : \nabla f(x^*) = 0$

So, $x^* = 2$

(d) if step size α is too large: oscillations (no convergence)

if step size α is too small: slow convergence

(e)