**Optimization and Machine Learning**

**Assignment 1**

Due Date: 22 March 2023, 5 pm

**Question 1.** We show the steps to obtain the given analytical solution of the one-dimensional subproblem for in this assignment.

We recall the Coordinate Descent Algorithm with weighted samples first.

Let’s say we have the following data *,* , scaled and following input ,*,*  /\*Analytical Solution (from the slides)\*/.

For in the coordinate descent with weighted samples,.

We aim to minimize the following term:

.

It is to minimize the following term:

where is defined as:

Let’s define as follows:

If .

So, when we plug into , we get:

End of steps.