

ELEG5481 Signal Processing Optimization Techniques

Tutorial 11

Apr. 15, 2013

Q1. Consider the following problem.

$$\begin{aligned} \min_x \quad & \|x - y\|_2^2 \\ \text{s.t.} \quad & x \geq a, \quad c - b^T x \geq 0. \end{aligned}$$

where $y \in \mathbf{R}^n$, $a, b \in \mathbf{R}_+^n$, and $c \in \mathbf{R}_{++}$ are given data. We assume the problem is strictly feasible.

- (a) Write down the KKT conditions.
- (b) Let x^* denote the primal optimal solution and σ^* denote the dual optimal solution associated with the constraint $c - b^T x \geq 0$. From the KKT conditions, derive the relationship between x^* and σ^* .
- (c) Devise a fast algorithm to find the primal and dual optimal solutions.