Quiz 4

Question 1: Branch & Bound -method

Solve the following integer problem with the branch-and-bound (B&B) -method and answer the questions. Start by choosing x_1 as the branching variable in node 0 and perform a width-first search.

$$\begin{aligned} &\min\ z = 3x_1 + 6x_2 \\ &\text{s.t.} \\ &7x_1 + 3x_2 \geq 40 \\ &x_1, x_2 \in \mathbb{Z}_+ \end{aligned}$$

(a) How many nodes are in the complete solution tree?

(b) How many subproblems are infeasible in the complete tree?

(c) How many subproblems have integer solutions?

Solution

(a) 3

(b) 0

(c) 1

Question 2: Bisection method

Minimize the function

$$f(x) = x^2 - 5x + 3$$

using Bisection method using initial interval $[1, 5]$ with tolerance $l = 1,5$ and answer the following questions:

(a) How many iterations are performed in the algorithm?

(b) What is the estimated location (= value of x) of the minimum at the end of the algorithm?

(c) What is the difference between the actual minimum location and the estimated location in (b)?

Solution

(a) 2

(b) $x = \frac{5}{2}$

(c) 0