Operations Research

Homework 10

Due on November 22, 2023

Note: Your homework must be submitted via moodle (see the link on the class website) on the due day BEFORE THE TUTORIAL, i.e., before 20:45.

Problem 1 [12 points]

(HL, Problem 10.3-11.) Consider the following nonlinear programming problem. Maximize

$$Z = 36x_1 + 9x_1^2 - 6x_1^3 + 36x_2 - 3x_2^3,$$

subject to

$$x_1 + x_2 \leq 3$$

and

$$x_1 \geq 0, \ x_2 \geq 0.$$

Use dynamic programming to solve this problem.

Problem 2 [8 points]

A chip manufacturer produces CPUs that are so complex that it is impossible to test every single function of the CPU in a production run, but it is possible to design a test that finds a defect with probability $p < 1$. Moreover, $\frac{9}{10}$ of all CPUs that are produced are defective. What value of p is needed to guarantee that 99% of all CPUs shipped work?