

SSY281 Model Predictive Control

Micro-homework 7

Solving QP problems

Deadline: February 15, 10:00

Systems & Control
Department of Electrical Engineering
Chalmers University of Technology

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Instructions

This assignment is **individual** and must be solved according to the following rules and instructions:

- Written report:
 - It should be one page with pdf format.
 - The report should be uploaded *before the deadline* to your project document area in PingPong.
 - Name the report as MA7_XX.pdf, where XX is your *group* number.

Question 1. Write the dual problem for the following QP.

$$\begin{aligned} \min_x \quad & x_1^2 + 2x_2^2 \\ \text{s.t.} \quad & x_1 \leq 2 \\ & x_1 - 2x_2 = 1 \end{aligned}$$

Question 2. Write the dual problem for the following LP.

$$\begin{aligned} \min_x \quad & x_1 + x_2 \\ \text{s.t.} \quad & x_1 \leq 1 \\ & x_1 + 2x_2 = 5 \end{aligned}$$

Question 3. Solve the problem in Question 1 (graphically or in Matlab) and show that the strong duality holds.

Question 4. Compare active set methods with the interior point methods in term of the feasibility of their solutions before their convergence to the optimal solution.