

SSY281 Model Predictive Control

## Micro-homework 8

MPC practice

Deadline: February 19, 10:00
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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 MA8\_XX.pdf, where XX is your *group* number.

**Question 1.** *Consider the RH controller in slide 46. If the initial state of the plant  $x_0$  is admissible, will the RH controller be feasible at all time?*

**Question 2.** *How can we guarantee that the state of a dynamical system, in closed-loop with a MPC controller, evolves along trajectories such that the optimization problem will remain feasible at all times?*

**Question 3.** *What are the pros and cons of having a really small terminal set, like  $\mathbb{X}_f = 0$ , versus a large terminal set, like  $\mathbb{X}_f = \mathbb{R}^n$ .*

**Question 4.** *Consider a RH controller, with a terminal set constraint  $\mathbb{X}_f$ . How can you prevent infeasibility other than with the method you proposed in Question 2? Explain pros and cons of your solution.*