

SSY281 Model Predictive Control

Micro-homework 10

Feasibility

Deadline: February 26, 10:00

Systems & Control
Department of Electrical Engineering
Chalmers University of Technology

February 2019

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 MA10_XX.pdf, where XX is your *group* number.

Question 1. *Given a linear dynamical system $x^+ = f(x, u)$, along with state and input constraints $x \in \mathcal{X}$, $u \in \mathcal{U}$, a terminal set constraint $x \in \mathcal{X}_f$ and the stage and terminal costs $l(x, u)$, $V_f(x)$, defining a cost function, what does the feasibility of the resulting RH controller depend on?*

Question 2. *Mathematically define the feasibility set \mathcal{X}_N for the RH controller at question a).*

Question 3. *Provide the mathematical definition of an invariant set and concisely explain its meaning.*

Question 4. *What is the difference between an invariant and a control invariant set?*

Question 5. *If \mathcal{X}_f is a control invariant set, which property does hold for the feasibility set \mathcal{X}_N ?*