February 26, 2025

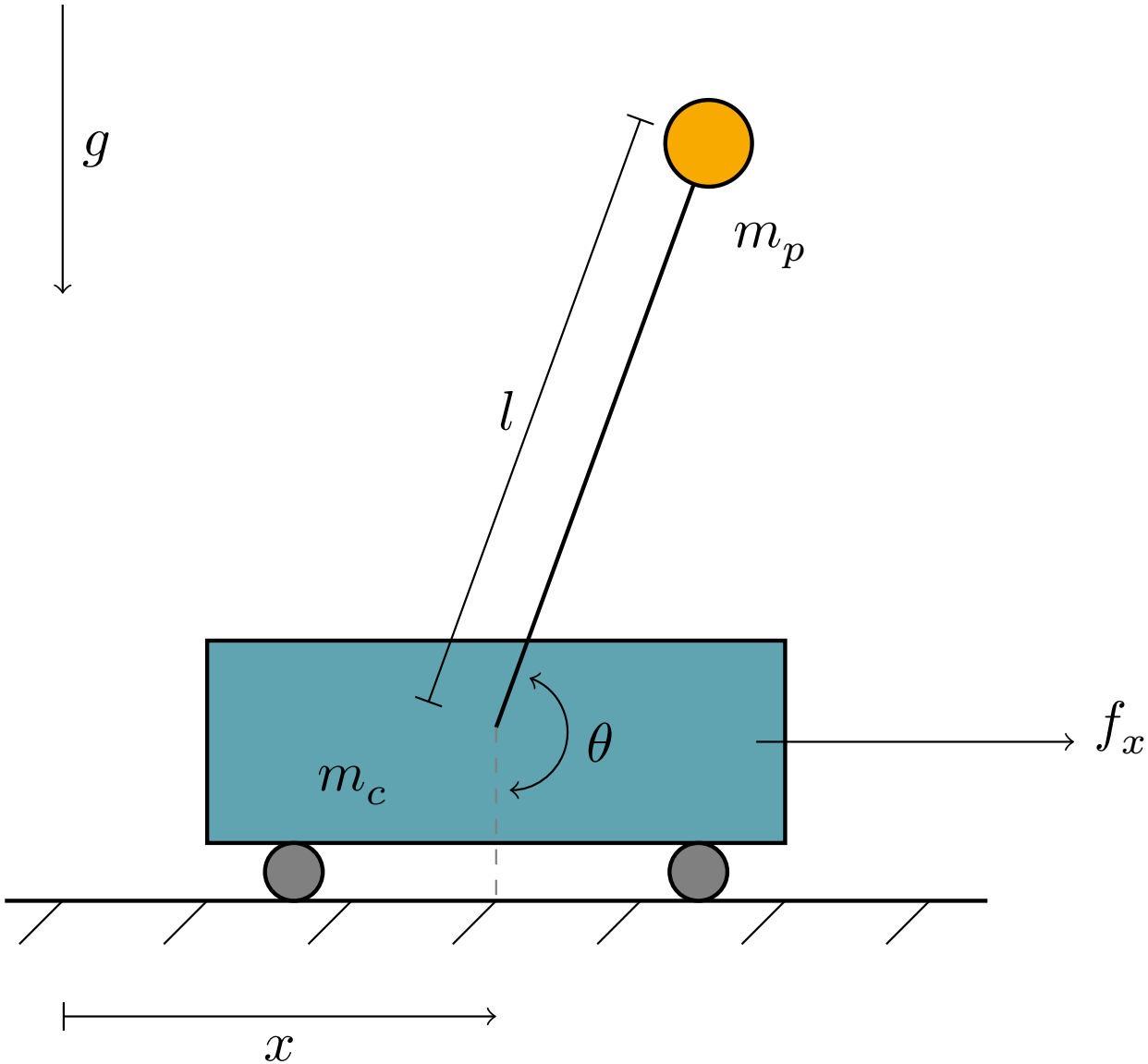
SYST0022-1

Laboratories 1 & 2

- Cart-pole system
- Laboratory 1
- Laboratory 2

Guillaume Drion Pierre Sacré Jérôme Adriaens

Cart-pole System



g : Gravity force

l : Pole length

m_p : Pole mass

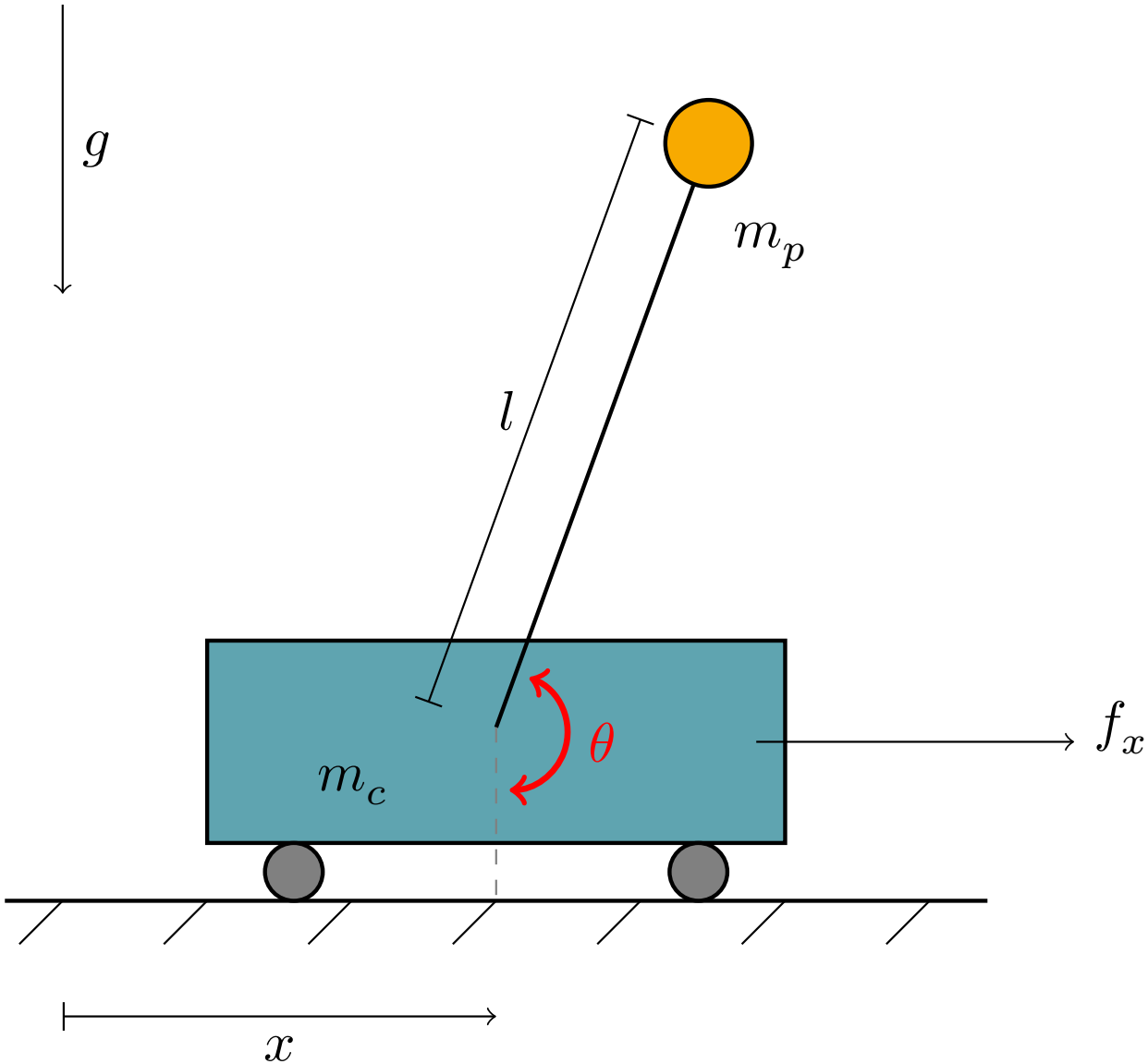
m_c : Cart mass

x : Cart position

θ : Pole angle

f_x : Force on the cart

Cart-pole System



g : Gravity force

l : Pole length

m_p : Pole mass

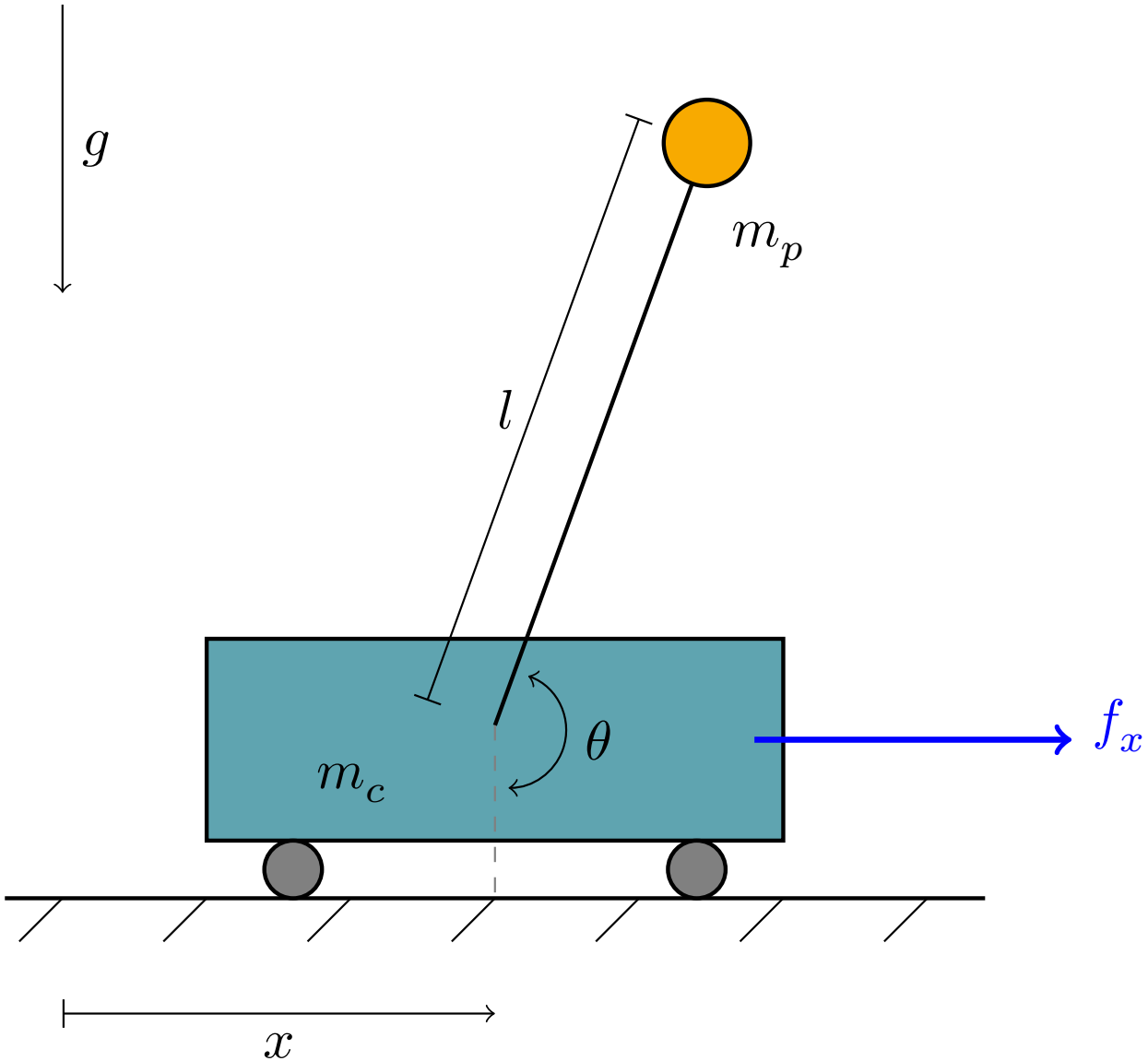
m_c : Cart mass

x : Cart position

θ : Pole angle

f_x : Force on the cart

Cart-pole System



g : Gravity force

l : Pole length

m_p : Pole mass

m_c : Cart mass

x : Cart position

θ : Pole angle

f_x : Force on the cart

Laboratory 1: Intuitive PID

Focus on:

- Negative feedback
- PID controller notions

Deliverable :

- Report as a .pdf file
- Submission on Gradescope
- Deadline is **7th of March 2025, 11:59PM**

The notebook for the laboratory is published on Ed.

Laboratory 2: PID Design via Loop shaping

Focus on:

- Gang of Four
- Nyquist plot and Simplified criterion
- Stability margins

Deliverable :

- Report as a .pdf file
- Submission on Gradescope
- Deadline is **14th of March 2025, 11:59PM**

The notebook for the laboratory is published on Ed.

Collaboration Policy

You can discuss the assignment with other students, but you must write your own solutions.
Copying someone else's solution, or just making trivial changes to avoid copying verbatim, is not acceptable.