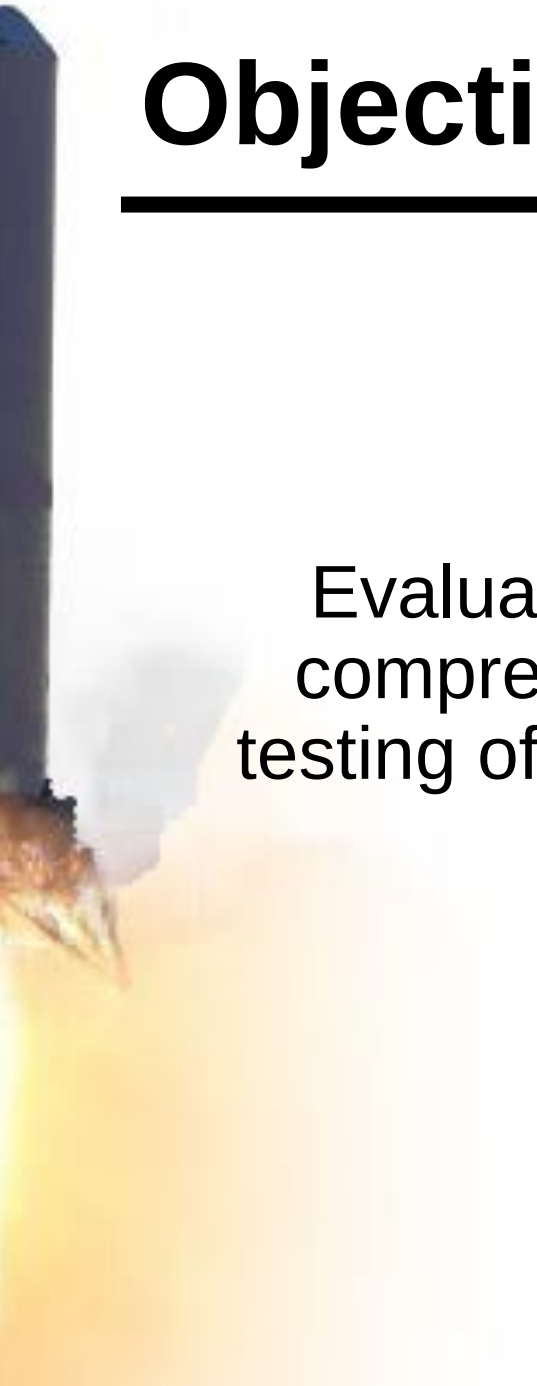
Model Rocket with active vertical stabilization

Concurrent Engineering project

Objective

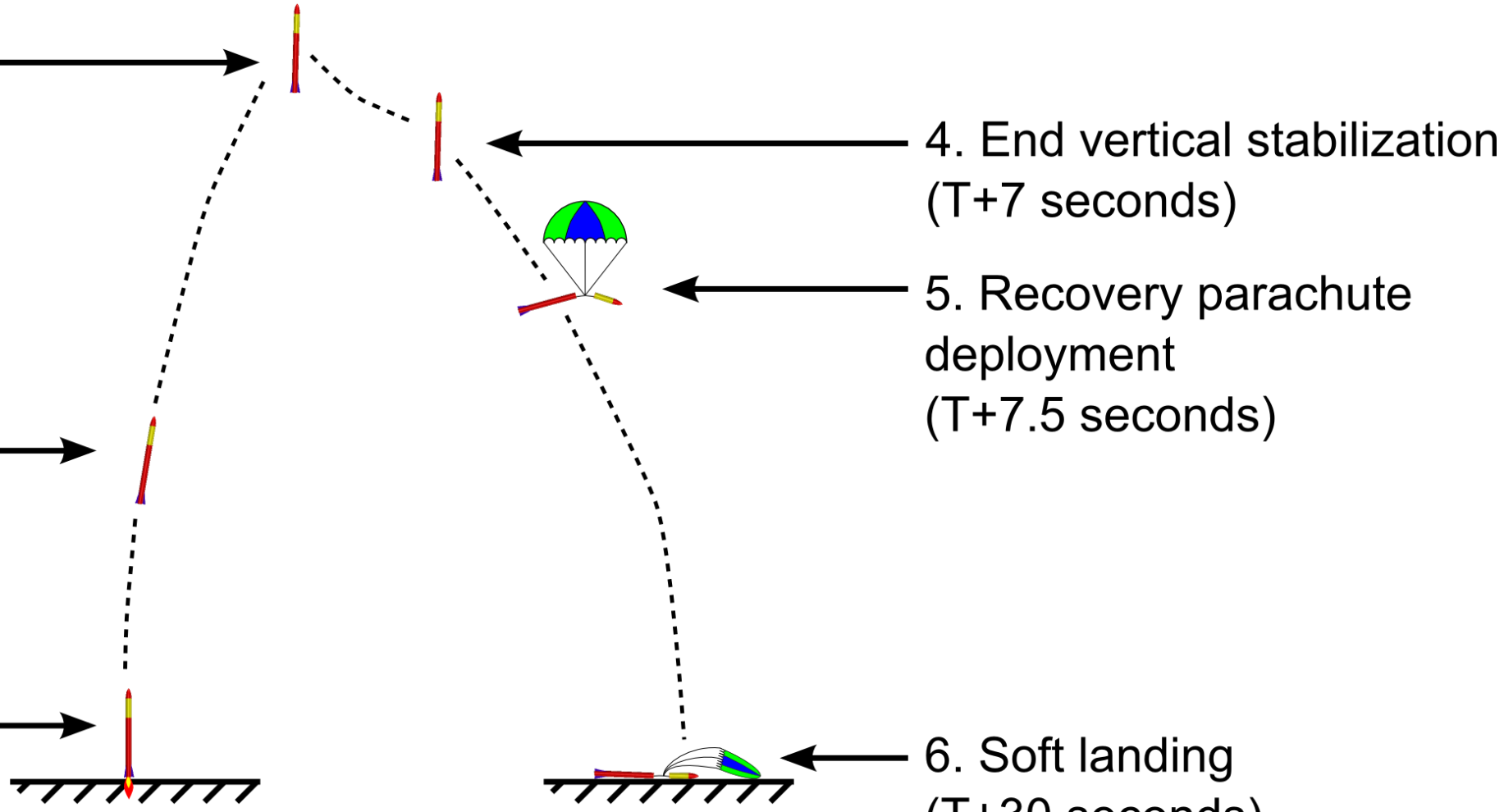


Evaluate the effectiveness of active vertical stabilization by compressed gas through the design, manufacture and flight testing of a model rocket employing such a stabilization device.

Work to be done in concurrent engineering project

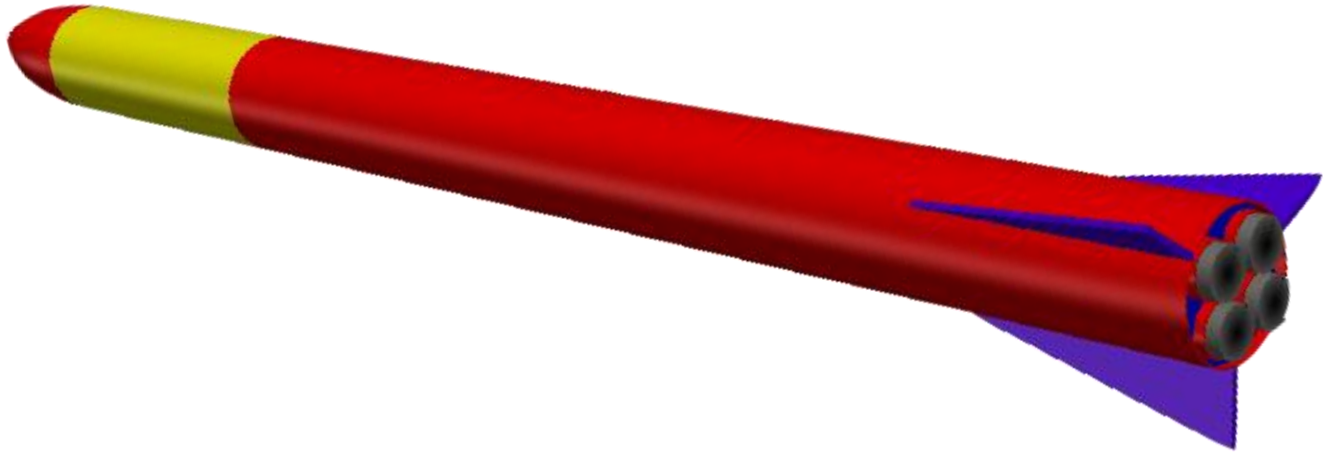
- Review rocket concept
- Draw rocket in SolidWorks
- Simulate rocket with CFD & FE
- Build rocket (ateliers)
- Fly rocket with the vertical stabilization
  - «On» for control test
  - «Off» for stability comparison
- Write a project report

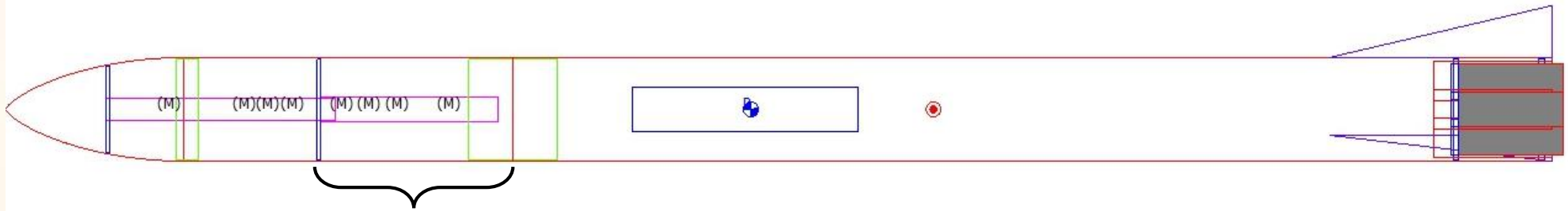
Concept mission plan



Concept rocket (current state)

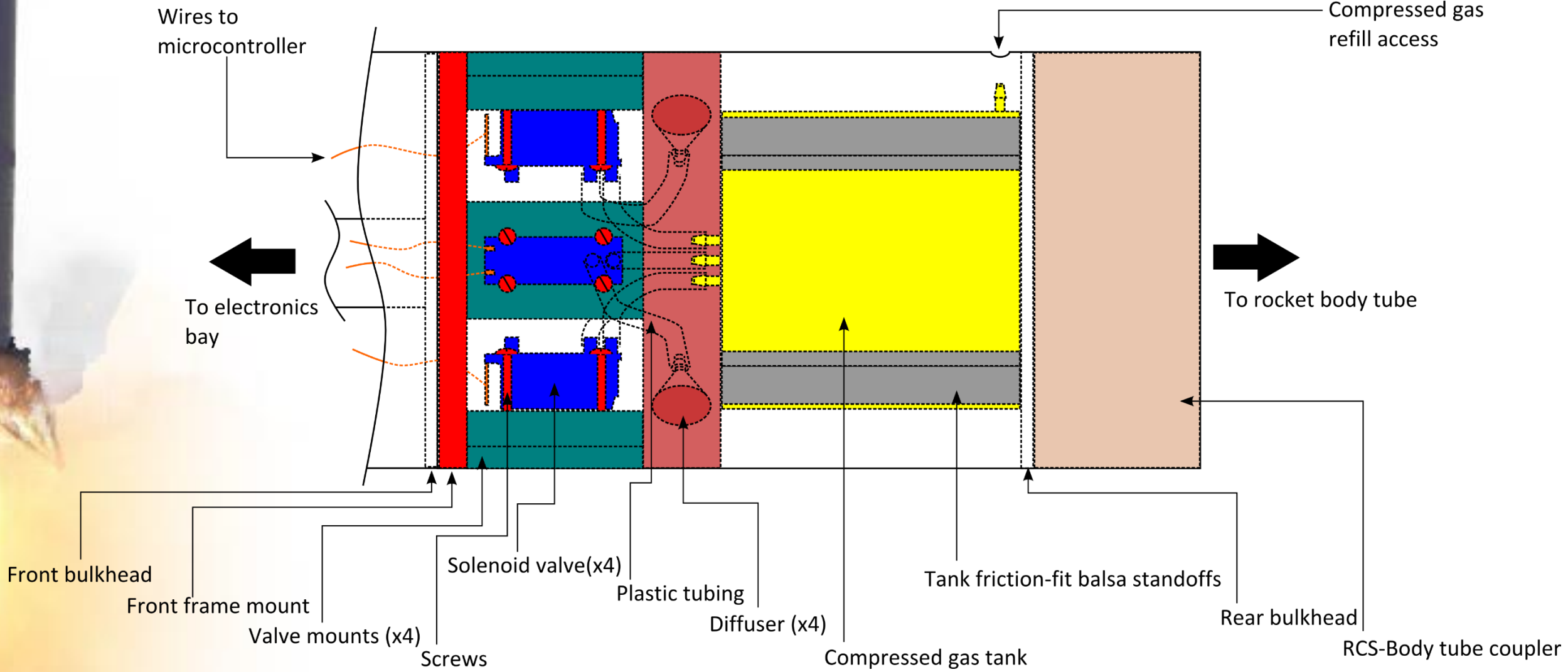
MM-1
Length: 104.203 cm , Diameter: 7.000 cm , Span diameter: 14.000 cm
Mass 1140.443 g , Selected stage mass 1140.443 g
CG: 50.210 cm, CP: 62.505 cm, Margin: 1.76
Engines: [D12-None, D12-None, D12-None, D12-None,]





Reaction **C**ontrol **S**ystem (RCS)

Concept RCS (current state)



Task division (1)

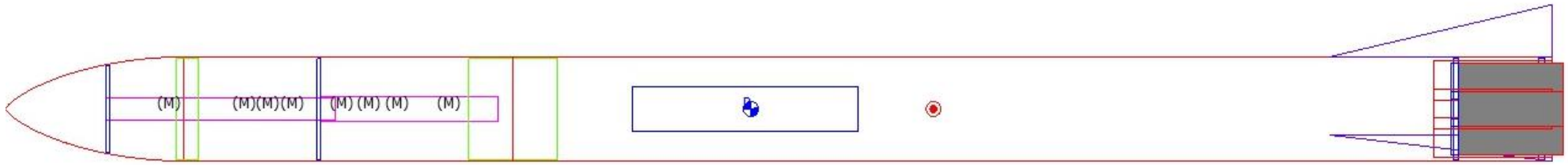
Supervisor (Anton Ivanov)

«**Rocket**» team
Leader: Nikolay Mullin

«**Controls**» team
Leader: Danylo Malyuta

- Rocket body (1 person)
- Launch systems (1 person)
- Numerical simulations (1 person)
- RCS module (Danylo Malyuta)
- Control algorithm development and simulation (1 engineer)
- Sensor interfaces and programming (1 engineer)

Task division (2)



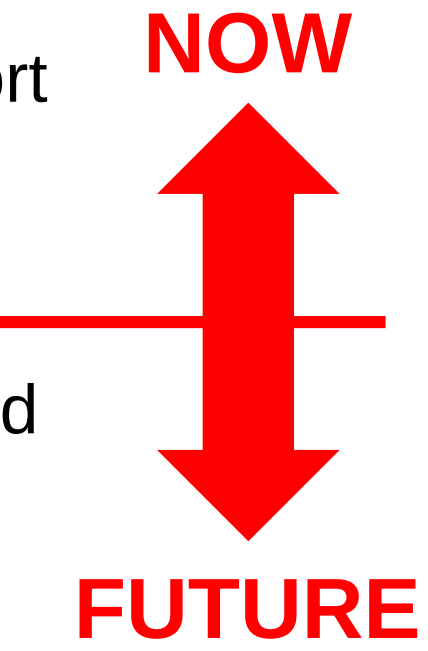
«**Controls**»
team

Concurrent Engineering!

«**Rocket**»
team

This project offers

- Educational experience in aerospace design
- Experience in writing and publishing a professional report
  - Published in AIAA
  - Great for engineering CV



- A platform for the design and improvement of control and other moving body questions.
- A platform for future experiments (e.g. ecological experimental payload).
- A technological breakthrough for model rocketry if successful

Final comments

- You should be:
  - Motivated & organized
  - Competent to tackle challenging tasks
  - Willing to put in the necessary working hours 
  - Familiar with RC/rocket modeling
- For any questions regarding “Rocket” team, talk to Nikolay Mullin (nikolay.mullin@epfl.ch)
- For any questions regarding “Controls” team, talk to Danylo Malyuta (in your class, front row during lectures) or write to danylo.malyuta@epfl.ch
- For any general questions, talk to Danylo Malyuta.