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OCP/MPC Workshop 2024
Overview of the course

MISTI MIT Global Experiences

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Overview of the course

Who are we?

MECO Research Team – KU Leuven

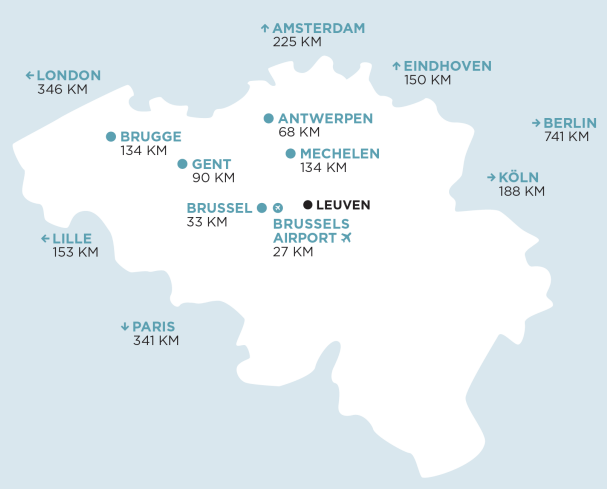
Wilm Decré

Alejandro Astudillo

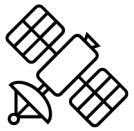
Louis Callens

Alex Gonzalez García

https://commons.wikimedia.org/wiki/File:EU-Belgium.svg



Space



Fundamentals	Methodologies	Applications
Algorithmic differentiation	Nonlinear system identification	Machine tools
Efficient computations	Learning for control	Robotics
Optimization algorithms	Motion planning	Autonomous vehicles
	Model predictive control	Drones
	Linear feedback control	Process control

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Software

CasADi

algorithmic differentiation, C-code generation, interface to many solvers,
web.casadi.org

Opti Stack

collection of CasADi helper classes to facilitate nonlinear programming

rockit

Rapid Optimal Control KIT on top of CasADi Opti,
gitlab.kuleuven.be/meco-software/rockit

FATROP

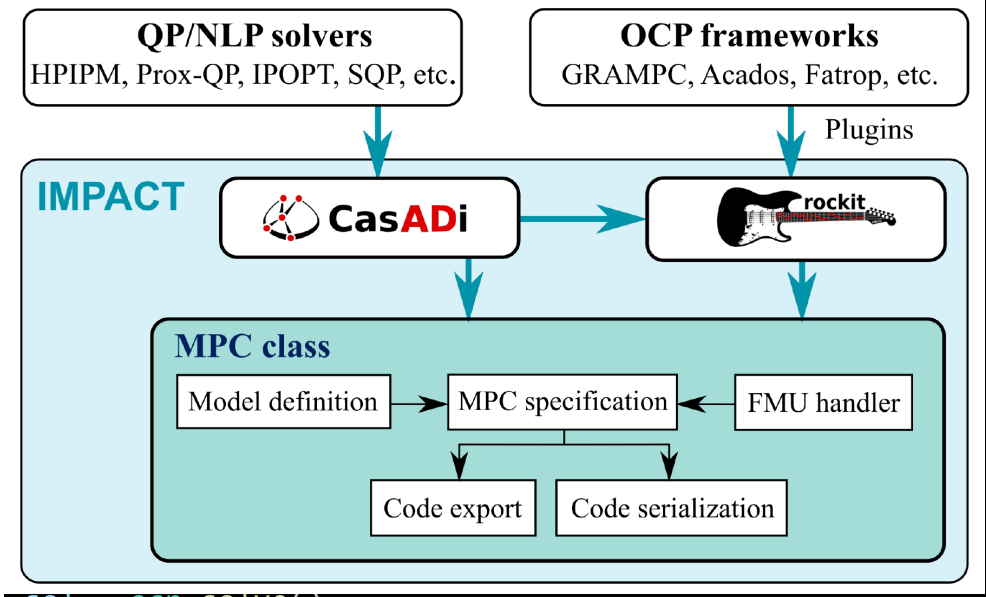
FAst TRajectory OPtimizer, github.com/meco-group/fatrop

Impact

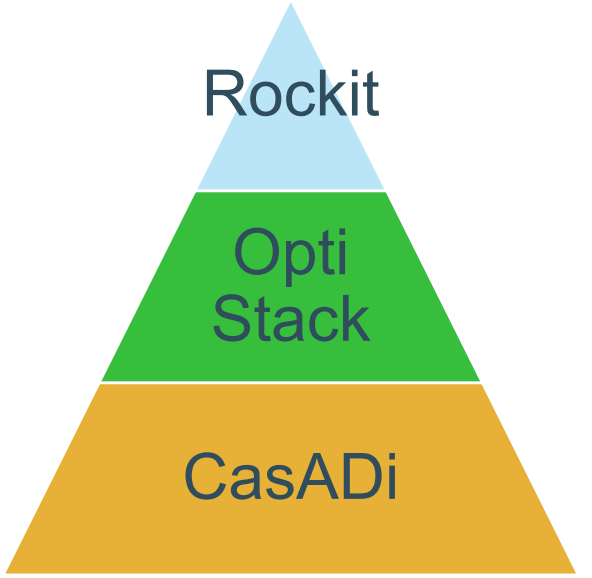
nonlinear model predictive control specification, prototyping and deployment,
gitlab.kuleuven.be/meco-software/impact

All released under the LGPLv3

```
from casadi import *
minimize (1-x)^2+(y-x^2)^2
```




```
sol = ocp.solve()
```



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Agenda

Session	Time	Topic
DAY 1		
Th. 1		Nonlinear programming
Pr. 1		CasADi and its Opti stack
		Lunch break
Th. 2		Nonlinear optimal control
Pr. 2		Rockit (part 1)
DAY 2		
Pr. 3		Rockit (part 2)
Th. 3		Nonlinear model predictive control
Pr. 4		Impact