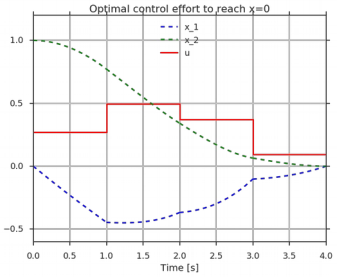
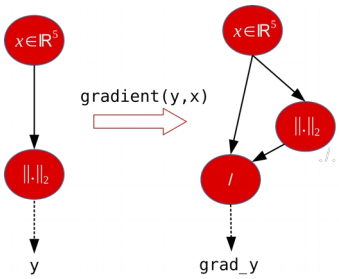
Hands-on CasADi course on optimal control
18-20 November 2019 – Hasselt, Belgium





Target audience academic/industrial researchers or tool-developers that seek practical ways to tackle large/complex continuous optimization problems, and optimal control problems in particular.

CasADi? Originating from KU Leuven's "*Optimization in Engineering Center*" under guidance of prof. Moritz Diehl, CasADi [1, http://casadi.org] is an open-source software framework for nonlinear optimization and algorithmic differentiation. It facilitates rapid - yet efficient - implementation of different methods for numerical optimal control, both in an offline context and for nonlinear model predictive control.

Format Seminars (40%) paired with computer exercises (60%). The seminars provide a bird's-eye view on optimization and optimal control, serving as teaser for further study or as recap for the experienced. The computer exercises aim to deepen understanding of the theory, and leave the participants well-equipped to solve a broad range of problems using CasADi by themselves.

Covered topics Newton-type methods for constrained nonlinear programming – integration methods – direct transcription of optimal control problems (OCP) – model predictive control (MPC) – CasADi syntax and best practices

Prerequisites Basic mathematical skills (analysis, calculus, linear algebra) are required. Experience with programming in MATLAB/Octave or Python is required, unless you partner up with an experienced person.

Tutor Joris Gillis obtained his PhD in electrical engineering at KU Leuven in 2015. Currently a post-doc at MECO, KU Leuven and part-time freelancer, he pursues large-scale applications in optimal control and is highly active as a main developer of CasADi since 2010.

Practicalities The course will take place at the Radisson Blu hotel, Torenplein 8, 3500 Hasselt, Belgium, starting each day at 9:15 and ending on 18:00. The registration fee amounts to 750 EUR excl. VAT (450 EUR for PhD students). This includes lunches and a social dinner on November 19. Lodging is not included.
Participants are required to bring their own laptops (Linux/Windows/Mac); no software is needed besides a working installation of MATLAB/Octave or Python.

Registration Register before November 1, 2019, at http://hasselt2019.casadi.org/ – the event is limited to 50 participants.

Organizer Joris Gillis, joris@yacoda.com, +32496432937

[1] Joel A. E. Andersson, Joris Gillis, Greg Horn, James B. Rawlings, M. Diehl, "*CasADi – A software framework for nonlinear optimization and optimal control*," Mathematical Programming Computation, 2018.

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