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Title: Understanding modern concepts of Optimization and Optimal Control with WORHPLab

Abstract: The ESA–NLP solver WORHP is already used in several academic and industrial projects in a wide range of applications, as aerospace, automotive or logistics. Currently over 600 users worldwide code their problem formulations using the standard interfaces to Fortran, C/C++, MATLAB and others.

To simplify the formulation of optimisation problems for demonstrational and educational purposes WORHPLab is developed as a graphical user interface (GUI). With a growing set of applied examples and visualisation techniques it shows the capabilities of the underlying solver WORHP and opens access to more involved concepts like parametric sensitivity analysis using WORHPZen and others.

Moreover, WORHPLab provides the possibility to solve optimal control problems using our transcription technique TransWORHP. Different approaches like full discretisation with grid refinement or multiple shooting are compared easily within this tool. Additionally, optimal control problems on reduced time horizons can be solved to illustrate concepts of non– linear model predictive control (MPC).

WORHP Lab was already employed successfully in several industrial workshops as well as for educational purposes with pupils and students. In this presentation, we try to bridge the gap between nonlinear optimization and optimal control problems by treating both: theory and practical implementation.

All participiants are invited to solve problems with the WORHPLab by themselves. A download adress will be provided in time.