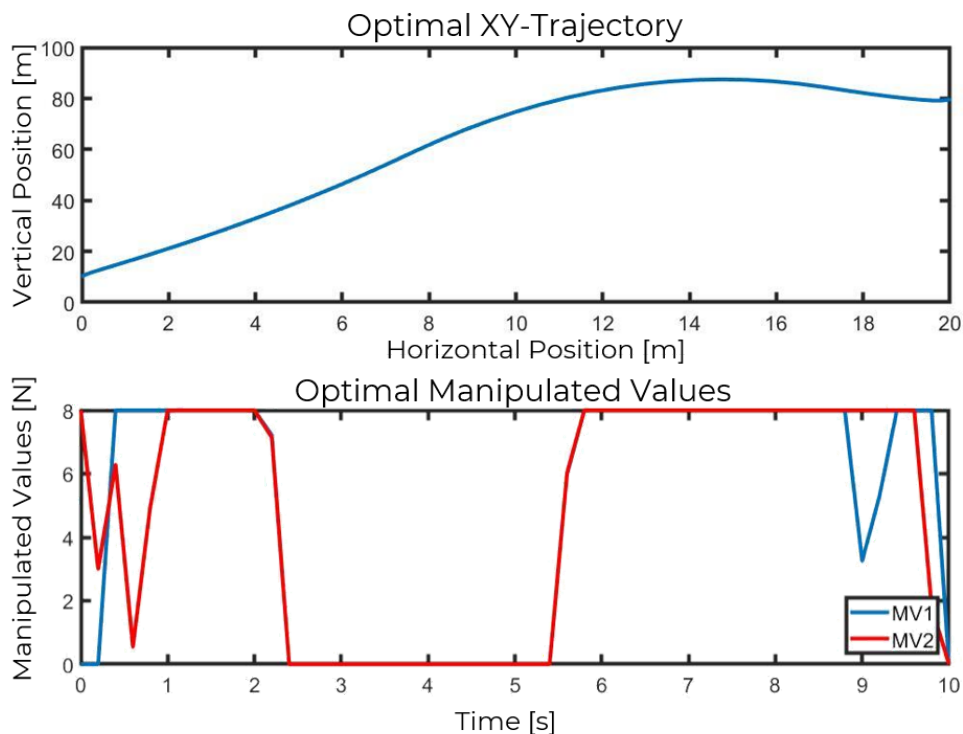# FORCESPRO 4.3 Release

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FORCESPRO

Full flexibility & increased speed for MathWorks Model Predictive Control Toolbox™

- **MATLAB® plugin:** The MathWorks, Inc. and Embotech have jointly enhanced the MATLAB® plugin that connects FORCESPRO with MathWorks Model Predictive Control Toolbox™. With this update, users are now able to formulate a multi-stage MPC problem within the toolbox and solve the resulting optimization problem with the numerical robustness of the FORCESPRO solver. This enhancement increases the flexibility in the problem formulation while at the same time reducing the computation time by tailored structure exploitation. Both aspects are relevant for industrial applications such as trajectory planning for autonomous driving on embedded hardware.

- **Updated memory allocation mechanism**: The new FORCESPRO version gives the user full control over memory allocation. You can pre-allocate all the memory FORCESPPRO is using by yourself, which results in higher flexibility in deployments on embedded platforms. Runnning several FORCESPRO instances in parallel with multi-threading can be handled on all embedded platforms in a very memory-efficient way.

- **New examples in the documentation**: The latest release is shipped

with new examples that show hands-on applications of FORCESPRO. In the documentation, you can find one example for testing of the updated **MATLAB®** plugin. This example illustrates guidance computation for rocket landing trajectories. The example is based on a nonlinear ODE with 6 states and a prediction horizon of N=50. With the NLMPC Multistage object, FORCESPRO can solve the optimization problem with a computation time of 5.7msec. Other examples show how to implement **rate constraints** and **soft constraints** within the MPC formulation.

Example for optimal rocket landing trajectory calculation

Please note: FORCESPRO 4.3 release uses CASADI v3.5.1 as default AD tool. The FORCESPRO 4.3 release also supports CASADI v3.5.5 within MATLAB® / Simulink.

You can find a list of all algorithmic improvements in the **Release Notes of FORCESPRO 4.3.**

Existing users can easily switch to the new version by using our **auto-update function.**

Alternatively, you can use the new server at: **https://forces-4-3-0.embotech.com/**

You can find a list of settings for maintaining codeoptions of old FORCESPRO versions in the **legacy list.**

Note: Version 3.0.1 will go offline as of May 31, 2021.

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