

Cognitive Polymer Extrusion & Compounding

Model predictive control and disturbance observer for plastics extrusion



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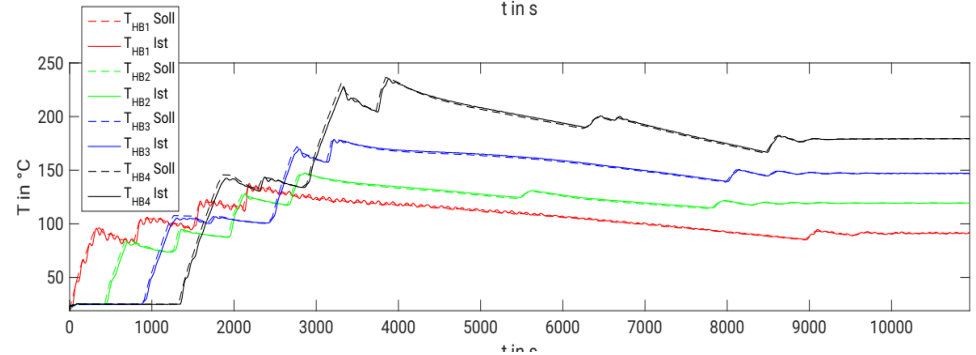
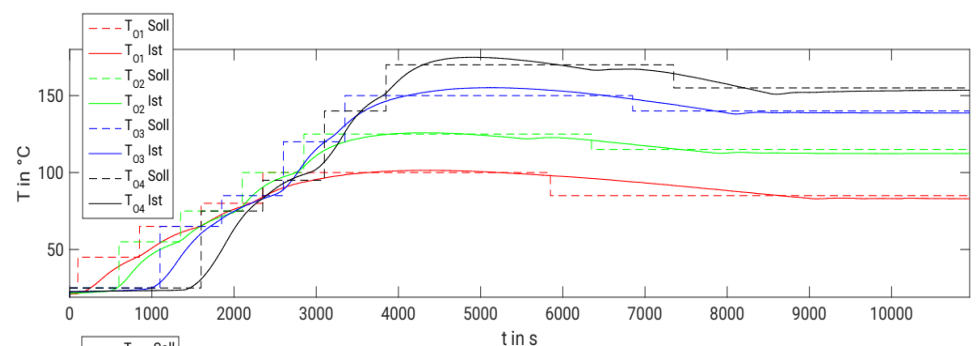
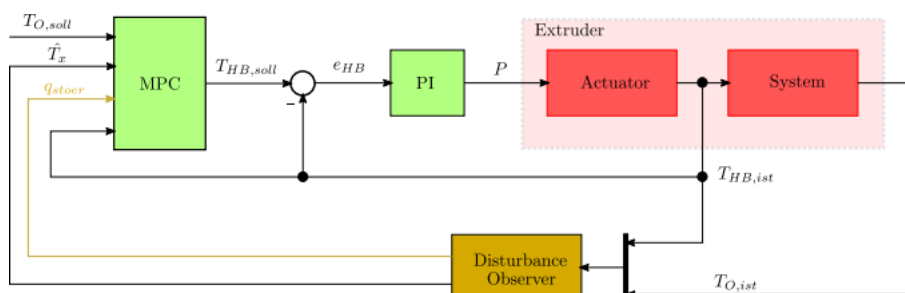


Motivation & Goals

- Improve product quality: Estimate the temperature distributions within the extruder, as well as the heat flow between melt and barrel - Disturbance Observer based on precise process model
- Optimize the production process: Optimal control of the nonlinear heating system guarantees the required temperature distribution a mass flow - MPC (Model Predictive Control) for start up, as well as set point and material change.
- Improve the basic automation: Optimized algorithms for the implementation subordinate control loops

Project FactBox

Project Name CoExCo
Project ID MFP 4.2.1
Duration 48 Months
Area 4.2
 Cognitive Production Systems
Project Lead
 Mag. Bernhard Löw-Baselli



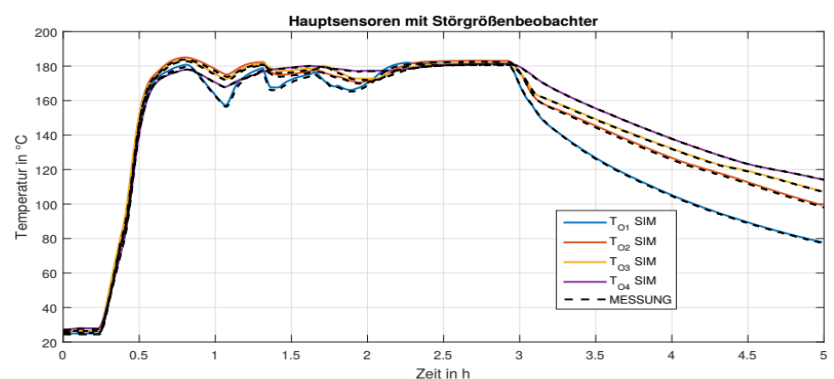
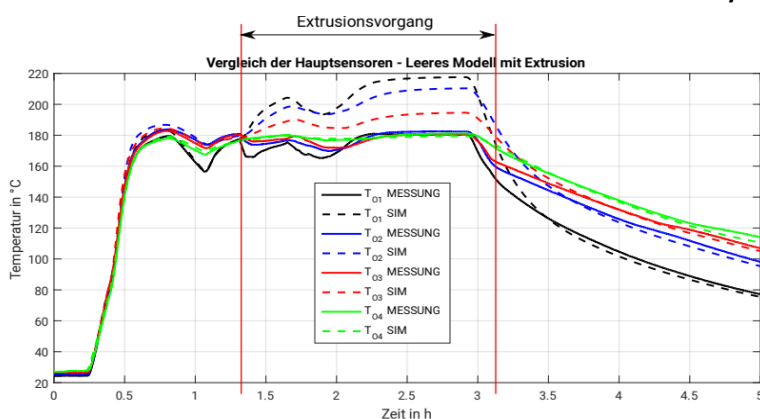
Simulation Results - MPC

The MPC's suitability was proven by several simulation Studies and lab tests (Results on the right). Reference trajectory were specified to check the MPC controller, which determined the optimal heating strategy. The plots compares the sensor values (T) of a production with simulation results.

Simulation Results - MPC with Disturbance Observer

Left: Results with a conventional observer only.

Right: Measurements with an added disturbance observer.



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