# Semesterarbeit

Analysis and Calibration of a Physical Model for a small-scale Processing Plant

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Optimization of processes is a goal pursued in large plants aiming at increasing product quality and reduction of production costs. The increasing demand for heterogeneous products requires a flexible and efficient operation as well as new ideas on production methods and automation. The Department of Measurement and Control (Mess- und Regelungstechnik, MRT) built up the model factory μPlant to facilitate an environment to develop new concepts for plant operation and to test these ideas in a simulated industrial framework. The model factory μPlant consists of two processing islands, a sorting and emptying station, a stock area with buckling arm robot, several mobile robots, which transport the product in the location, and a control station for operating the plant.
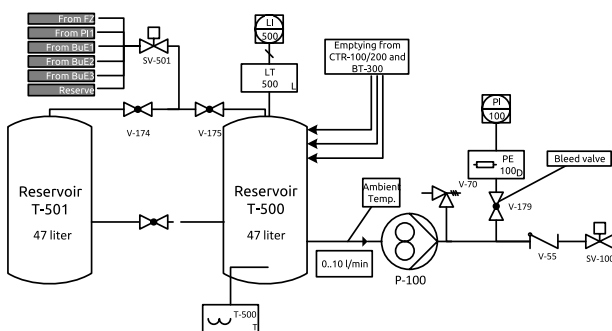
The targeted second processing island (PI2) consists of three main units. Two units are reactors where two different intermediate products are produced. The third unit is a continuously stirred reactor where the two intermediate products are blended. The processing schema includes several material recycles, heat exchangers and control loops. The main goal of the present student project is to adjust an available mathematical model of the second processing island. First, a familiarization with the current model is required in order to understand the modeling approach and the model parameters that can be adjusted. Preliminary real data is also available and it can be used to compare with the simulation results. In addition, operational tests have to be carried out to get experience with operational constraints and plant dynamics and to collect data to calibrate the model parameters aiming at decreasing the model uncertainty. Different operational cases should be defined suitable to test data proposed for screening methods for system identification.

The tasks to be performed are:
- Familiarize with the available physical model
- Calibrate model parameters using plant data, possible improve model
- Design and perform of experiments that recreate real operating conditions
- Technical documentation and presentation of results

Hint: knowledge on MATLAB and programming skills are an advantage for carrying out the above mentioned tasks but can also be gathered during the assignment.

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