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Unser Zeichen:
KWT 9

Topic for master's thesis

Integration of design and operation

Processes are conventionally designed iteratively. First, the design specifications – such as reflux ratios, operating pressures, etc. – are fixed. Afterwards, the control scheme is designed. This approach is widely spread in industry, but the resulting flowsheet may be sub-optimal due to the inherent relationship between design and control. Therefore, researchers have developed new methodologies under the umbrella term "integration of design and operation" to design the process under steady-state and dynamic constraints simultaneously (see, e.g., Ricardez-Sandoval et al. (2009)).

In this thesis, a framework developed in the contact person's dissertation shall be extended. The list of possible extensions is long and includes the

- addition of a scheme to adapt the discretization
- addition of multi-frequency signals
- consideration of binary decisions
- and more

Task description:

- Discussion with Christian Hoffmann which extensions shall be part of the master's thesis (there are enough options for 3-4 theses)
- Implementation of the agreed extensions
- Application on a simple case study, such as a continuously-stirred tank reactor

Desirable skills:

- Experience in Python
- Knowledge of optimization methods

References:

L. A. Ricardez-Sandoval, H. M. Budman, P. L. Douglas (2009): Integration of design and control for chemical processes: DOI: 10.1016/j.arcontrol.2009.06.001

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