

Titel: Process Control and Optimization with Stochastic Adaptive Control Algorithms

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Abstract

There exists a wide variety of process control methods, e.g., for controlling the purity in a distillation or separation process. All of them contain one or more parameters which must be assigned a value. For instance, a PID controller contains three gains which must be tuned. However, while the choice of these parameters might be appropriate for one set of operating conditions or at a particular point in time, the process or its ambient conditions might fluctuate or change over time.

Wear of the equipment, fluctuations in the feed, and variations in the outside temperature or humidity are common examples of such changes, and they can render a well-tuned controller entirely unusable. The consequences can be large offsets or variations in the control target leading to, e.g., violation of purity constraints or uneconomical operation.

In this presentation, we demonstrate how stochastic adaptive control algorithms use system identification methods to monitor changes in the operating conditions and continuously redesign the underlying controller in order to mitigate the detrimental effects of time-varying or fluctuating process conditions. Finally, we show an example of stochastic adaptive control of a flash separation process.