# Open Thesis (BA/MA/SA)

## Active Forgetting in Learning Control Systems

**Description:**

Control scientists generally agree that continuous learning causes safety risks in real dynamic systems. On the other hand, the learning process should not simply be terminated, because otherwise a learning controller cannot react to changes in the controlled system after the learning phase is completed. Because of this dilemma, researchers today consider a higher-level control problem: the control of the learning rate in learning control systems. In simple terms, a controller should learn when new data contain important information about the controlled system, but if possible reduce the learning rate to increase safety. (Such changes do not necessarily lead to a lower control performance). In this thesis we will investigate the use of so-called forgetting triggers to control the learning process. These can be applied in Adaptive Least-Squares Algorithms, which provide excellent performance in controlling static systems. The learning rate in Least squares algorithms, however, decreases and converges towards zero in the limit of a growing data set. This can lead to poor performance when controlling non-static systems. Forgetting triggers come into play here by removing data from the data set if they no longer fit the current system behavior.

**Prerequisites:**

- Prior knowledge in: Basics of Probability Theory
- Interest in: Learning Control Systems
- Lectures: Adaptive Control (recommended)

**Supervisors:**

Dennis Gramlich, Sebastian Schlor

**Area:**

Learning Control Systems

**Properties:**

Type: BA/MA/SA

30% Literature
25% Implementation
45% Theory

**Beginning:**

any time

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

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