

## Abstract

**Kruif, B.J. de**, "*Function Approximation for Learning Control a key sample based approach*", University of Twente, Enschede, Netherlands, pp. xiv - 189, 90-365-2050-9, 2004 (Supervised by J. van Amerongen, with T.J.A. de Vries)

A function approximator plays an important part within a learning control setting. The approximator is responsible for storing information on previously encountered situations, so that the controller can use this to improve its behaviour.

In this thesis two function approximators are introduced for learning control: the key sample machine and the recursive key sample machine. Both approximators alter their *structure* and their *parameters* based on the data supplied. The first uses a batch of data to arrive at an approximation, while the recursive key sample machine processes only one sample a time to arrive at an approximation.

The complexity of the structure for the approximation depends on the quality and the quantity of the data. This results in an accurate approximation if there is much or accurate data, while a rough approximation is selected if there is little or noisy data. The curse of dimensionality is avoided by not dividing the input space into separate regions but by forming an approximation based on similarities with a selected subset of the training samples.

The function approximators are tested in an improved Learning FeedForward Control setting. In these experiments it is shown that the approximators are capable of significantly reducing the tracking error for a mechanical setup.