# Informatik-Oberseminar

**Fachgruppe Informatik**

Lehrstuhl für Informatik VII

RWTH
RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN

# EINLADUNG

Zeit: Mittwoch, 23. November 2011, 15.00 Uhr

Ort: Hörsaal AHIII, Ahornstr. 55

Referent: Dipl.-Inform. Michaela Slaats

Titel: Infinite Regular Games in the Higher-Order Pushdown and the Parametrized Setting

## Abstract:


Higher-order pushdown systems extend the idea of pushdown systems by using a "higher order stack" (which is a nested stack). More precisely on level 1 this is a standard stack, on level 2 it is a stack of stacks, and so on. We study the higher-order pushdown systems in the context of infinite regular games.

In the first part of this talk, we present a k-ExpTime algorithm to compute global positional winning strategies for parity games which are played on the configuration graph of a level-k higher-order pushdown system. To represent those winning strategies in a finite way we use a notion of regularity for sets of higher-order stacks that relies on certain ("symmetric") operations to build higher-order stacks. The construction of the strategies is based on automata theoretic techniques and uses the fact that the higher-order stacks constructed by symmetric operations can be arranged uniquely in a tree structure.

In the second part of this talk, we study the solution of games in the sense of Gale and Stewart where the winning condition is specified by an MSO-formula $\varphi(P)$ with a parameter $P \subseteq \mathbb{N}$. This corresponds to a three player game where the i-th round between the two original players is extended by the choice of the bit 1 or 0 depending on whether $i \in P$ or not. We consider the case that the parameter can be constructed by some deterministic machine, a "parameter generator". We solve the parametrized regular games for parameters P given by two kinds of such generators, namely: higher-order pushdown automata and collapsible pushdown automata.

In the third part, we study higher-order pushdown systems and higher-order counter systems (where the stack alphabet contains only one symbol), by comparing the language classes accepted by corresponding automata. For example, we show that level-k pushdown languages are level-(k+1) counter languages.


Es laden ein: Die Dozenten der Informatik