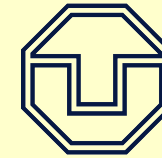
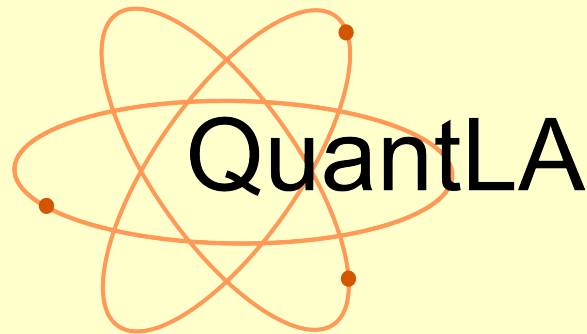


UNIVERSITÄT LEIPZIG

Fakultät für Mathematik und Informatik



TECHNISCHE
UNIVERSITÄT
DRESDEN

Prof. Dr. Dr. h.c. Reinhard Wilhelm

Universität des Saarlandes

hält am

Dienstag, dem 10. Dezember 2013, um 13.30 Uhr einen Vortrag zum Thema

Timing Analysis of Real-Time Systems

Abstract: Hard real-time systems are subject to stringent timing constraints which are dictated by the surrounding physical environment. A schedulability analysis has to be performed in order to guarantee that all timing constraints will be met ("timing validation"). Existing techniques for schedulability analysis require upper bounds for the execution times of all the system's tasks to be known. These upper bounds are commonly called worst-case execution times (WCETs). The WCET-determination problem has become non-trivial due to the advent of processor features such as caches, pipelines, and all kinds of speculation, which make the execution time of an individual instruction locally unpredictable. Such execution times may vary between a few cycles and several hundred cycles.

A combination of Abstract Interpretation (AI) with Integer Linear Programming (ILP) has been successfully used to determine precise upper bounds on the execution times of real-time programs. The task solved by abstract interpretation is to compute invariants about the processor's execution states at all program points.

These invariants describe the contents of caches, of the pipeline, of prediction units etc. They allow to verify local safety properties, safety properties who correspond to the absence of "timing accidents". Timing accidents, e.g. cache misses, pipeline stalls are reasons for the increase of the execution time of an individual instruction in an execution state.

The technology and tools have been used in the certification of several time-critical subsystems of the Airbus A380, the Airbus A350, and the M400. The AbsInt tool, aiT, is the only tool worldwide, validated for these avionics applications.

Ort: Felix-Klein-Hörsaal (P501), Paulinum, Augustusplatz, Leipzig
Alle Interessenten sind hierzu herzlich eingeladen.

Die Dozenten des Graduiertenkollegs „Quantitative Logiken und Automaten“