

## FREIE UNIVERSITÄT BERLIN Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

# DISPUTATION

**Montag, 9. September 2013, 9.30 Uhr**

**Ort: Takustraße 9, 14195 Berlin, Raum 005**

**Disputation über die Doktorarbeit von**

**Frau Diana Alina Serbanescu**

**Thema der Dissertation:**

**Testing Framework for Realtime and Embedded Systems**

**Thema der Disputation:**

**Real-time Testing of Safety-Critical Systems**

Die Arbeit wurde unter der Betreuung von **Prof. Dr.-Ing. I. Schieferdecker** durchgeführt.

Abstract: Real-time reactive and embedded systems are usually used in circumstances where safety is important and the margin for error is narrow. These kinds of systems have applicability in a broad range of domains such as: automotive, avionics, air traffic control, nuclear power stations, industrial control, etc. As the name denotes, the main feature of "real-time systems" is the criticality of their timeliness. Guaranteeing certain timeliness therefore requires appropriate testing.

This talk will present the key aspects relevant for testing of safety-critical systems with regard to their requirements for timeliness, schedulability and reliability.

The discussion will stem from questions such as "What are safety-critical systems and how should they be tested?" or "Which specifications and requirements are particular to safety-critical systems and how are these requirements influencing the testing process?" In this section, examples of safety-critical systems will be given and their requirements will be analyzed.

The testing process of safety-critical systems will then be presented further. Beginning from the early stages of product development, the importance of different types of testing and software validation and verification techniques with regard to real-time aspects of safety-critical systems, is furthermore recognized and analyzed.

A more comprehensive part of the discussion will focus on black-box testing, a type of testing used for validation of the finite product or of the product in the final stage of integration. First of all, the notions of real-time test system (RTTS) and real-time system under test (RTSUT) will be introduced and defined. In relation to these, aspects such as timeliness of inputs and outputs, validation, timeliness and robustness of both the RTTS and the RTSUT, communication between the RTTS and RTSUT, etc. will be analyzed.

The last part of the talk will present the state of the art for real-time testing, and an attempt will be made to answer the question: "What kinds of testing frameworks for real-time have been developed?". Over the course of discussion the testing frameworks will be evaluated and compared. The comparison will evolve around criteria such as real-time capabilities, automation, standardization and testing technique.

Based on the existing technologies, the future of real-time testing will be discussed. Summarizing the main features of the talk, mentioning what is already there and what is currently missing, an outlook for future work will be drawn.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

**Interessierte werden hiermit herzlich eingeladen**

Die Vorsitzende der Promotionskommission  
Prof. Dr.-Ing. I. Schieferdecker