FDA130

Formal Modeling and Verification for Real-Time Systems (CIS)

Lectures:
32 hours.

Recommended for
Graduate students, researchers, practitioners.

The course was last given:
New course.

Goals
To provide theoretical basics and to introduce advanced research issues. Examples will be presented and some state of the art tools will be discussed.

Prerequisites
Basic knowledge in logics, modeling and real-time systems.

Organization
Lectures.

Contents
Introduction

- Discrete and continuous time; modeling

Model checking basics

- Temporal logics
- Explicit state model checking
- Symbolic model checking

Model checking for discrete real-time

- RTCTL model checking
- Quantitative analysis

Models for continuous real-time

- Timed automata
- Time Petri nets

Model checking for timed automata

- Region graph
- Zone automaton
- Time-abstract (bi)simulations
- Tools: UPPAAL, KRONOS

Advanced model checking issues:

- Symbolic representation
- Partial order reduction

Languages for real-time systems:

- SDL
- Synchronous languages

Real-time system design and analysis:

- Compositionality issues
- Scheduling and control
- High-level design and refinement

Literature
Research papers.

Teacher
Marius Minea.

Examiner
Petru Eles, Zebo Peng.

Schedule
Fall 2002.

Examination
To be decided.

Credit
6 credits.