Modelling a Real-Time Control System using Parameterized Linear Hybrid Automata

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Abstract: Many real-time systems operate in safety-critical environments. Testing of these systems is hard in principle and can never guarantee full coverage. So a method for formally proving correctness is desirable. Another problem in real-time system design is the determination of deadlines and periods of time-critical processes as a prerequisite of the scheduler design. We want to use Hybrid Automata (HA) to tackle both problems. HA are a formal language that is equipped with semantics and thus accessible to formal analysis. We introduce the syntax and semantics of a new class of HA called Parameterized Linear Hybrid Automata and demonstrate its advantages by modelling a typical real-time control system using an extended version of the tool HieroMate.