

Master Thesis — Praxis der Forschung

Program Synthesis from Generalised Test Tables

Background. Automated production systems, such as industrial plants and assembly lines, are usually driven by *Programmable Logic Controllers* (PLCs). These computing devices are specially tailored to controlling automated production systems in mission- and safety-critical realtime environments. They are worthy goal for formal methods.

Generalised Test Tables are a table-based specification developed at the chair of Prof. Beckert. They arise from the concrete test table and preserve their comprehensibility although extended expressiveness.

Program synthesis is the generation of software that adheres a given specification. In contrast to formal verification, where a given software is checked for conformance against a specification.

Goal & Task. In this thesis, we want to develop a practicable method for the synthesis of PLC software from a set of Generalised Test Tables.

Your Profile. Programming skills in Java/Kotlin are required. Furthermore, you should be interested in programming languages, formal methods, and *theory of infinite games and automaton*. You should have completed the Formal Methods (Formale Systeme) Course at KIT or equivalent.

References. Bernhard Beckert, Suhyun Cha, Mattias Ulbrich, Birgit Vogel-Heuser and Alexander Weigl. Generalised Test Tables – A Practical Specification Language for Reactive Systems. iFM 2017.

#	INPUT		OUTPUT		DURATION	
	IN	PT	ET	Q		
0	FALSE	—	T#0ms	FALSE	≥ 1	} — ω
1	TRUE	>T#5ms	$\geq ET[-1], \leq PT$	TRUE	≥ 1	
2	—	$\geq PT[-1]$	$[ET[-1], PT]$	$=ET \leq PT$	≥ 1	

Kontakt

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