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Titel des Beitrags: Regression Verification for Programmable Logic Controller Software

Abstract: Automated production systems are usually driven by Programmable Logic Controllers (PLCs). These systems are long-living - yet have to adapt to changing requirements over time. This paper presents a novel method for regression verification of PLC code, which allows one to prove that a new revision of the plant's software does not break existing intended behavior. Our main contribution is the design, implementation, and evaluation of a regression verification method for PLC code. We also clarify and define the notion of program equivalence for reactive PLC code. Core elements of our method are a translation of PLC code into the SMV input language for model checkers, the adaptation of the coupling invariants concept to reactive systems, and the implementation of a toolchain using a model checker supporting invariant generation. We have successfully evaluated our approach using the Pick-and-Place Unit benchmark case study. Keywords: regression verification, symbolic model checking, automated production systems, programmable logic controllers (PLC)

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