



Aufgabenstellung für die Diplomarbeit

Für: Herrn Tao Chen

Studiengang: Elektrotechnik

Thema: Effective Regression Testing of Automotive Model-based Software using the Results of Stochastic Error Propagation Analysis

Model-based software development with MATLAB Simulink and StateFlow are widely used in safety critical domains including automotive, using a tool-chain for generation of executable code, and its deployment. ErrorPro is our new tool-set for analysis of data error propagation through cross-domain systems. It is based on a recently introduced dual-graph error propagation model (DEPM). ErrorPro has a MATLAB interface (SimPars) that allows the analysis of Simulink and StateFlow models. This should help to specify an effective testing strategy. In particular, in case of regression testing, a common way is to rerun an entire test-suite after system update. This requires a lot of effort and resources. The task of this diploma project is to develop and implement a prototype of the method that will identify which parts of the system will be affected by the errors, occurred in the updated components. This information helps to identify test-cases that stimulate faults activation in the updated components and detect the occurred errors. The next tasks should be accomplished:

1. Structural requirements definition (UML Diagrams)
2. State of the art research: (1) Testing methods for MATLAB Simulink software and (2) deep understanding of our methods and toolset (ErrorPro + SimPars)
3. Design and implementation: (1) Identify and implement required extensions for SimPars, (2) identify and implement required extensions for ErrorPro, and (3) implement the method and integrate it with ErrorPro
4. Demonstration the feasibility of the method with a representable case-study, testing of the implemented software
5. Documentation: doxygen-style documentation of the code, user manual
6. Optional: short video introduction

The relevant results of the other works that will be used in the DA must be clearly and fully stated in the written part using appropriate citations.

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