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Enhancing Formal Modelling Tool Support with Increased Automation

Author: Kenneth Lausdahl, Aarhus University Department of Engineering, Denmark

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Description:
The intrinsic complexity of even simple software systems makes their development challenging. This is especially true for heterogeneous embedded control systems that include the constraints of the physical world. Formal methods and modelling techniques allow software designs to be analysed and thus contribute to their reliability and robustness. However, industrial adoption of formal methods is limited by uncertainties related to their cost, effectiveness and the skills required. This thesis has three areas of focus: manual labour reduction through automation of various kinds of analysis, with focus on validation; language translation utilised to exploit existing automated analysis techniques; and a way to model and simulate embedded control systems that demand high-fidelity representation of their environment, based on a sound formal foundation. The result is a collection of contributions to a modern integrated development environment that can analyse software specifications and simulate hybrid embedded control systems with their environment.

Keywords: language translation