

# An Efficient Specification-Based Regression Test Selection Technique for E/E-Systems

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**Abstract:** Regression testing, a methodology originally developed for software development, is used to revalidate a (software) system in-between release cycles after having implemented changes. In practice there is always limited time to perform a full retest of a system; therefore a random/prioritizing-testing approach is often chosen to perform at least some regression testing. However, the lack of adequate regression testing can lead to exposed errors in untested parts of the system during production or field usage, which may have severe consequences. In order to improve the efficiency of regression testing, so far many approaches were proposed. They intend to select only test cases which cover parts of the system that contain the implemented changes as well as parts that are possibly affected by the change. Unfortunately, most techniques are only available on software level requiring extensive knowledge of the source code, and typically use some additional representation of the software such as a software architecture model. However, in practice, especially within automotive embedded system development, available system models or source code strongly vary in type or design or may even be inaccessible. In order to provide an efficient regression test selection methodology, we propose a novel and light-weight approach primarily based on system requirements and their association with test cases. In addition, substantial similarities between challenges and objectives of regression test selection and product lines testing techniques are identified. Conclusions outline how a potential benefit in reducing overall testing efforts in product lines testing can simply be achieved by applying regression test selection techniques.