Generating Multi-objective Programs from Variant-rich EAST-ADL Product Line Architectures

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Abstract: The design of robust architectures for software-intensive systems in the automotive domain is a complex task and a considerable engineering challenge. Even conventional systems are usually subject to a multitude of conflicting design goals, such as unit cost and weight minimization, dependability augmentation and timing control. One feasible approach to resolve these conflicting levers on a system's architecture is to perform an optimization analysis on a concretely defined design space, which in general is vast. For the purpose of the approach presented here, this design space is represented by an automated identification of variation points relevant for design space exploration. The identified variability information is then transformed into a convenient mathematical representation for product-line-aware architecture optimization.

Keywords: Model-based Analysis, Multi-objective Programming, Architecture Optimization, Pareto Optimality, Product Line Engineering

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