

Verification and Design Exploration through Meta Tool Integration with OpenModelica

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Modelica models are typically used for simulation to investigate properties of a possible system designs. This is often done manually or combined with optimization to select the best design parameters.

It is desirable to have systematic and partly auto-mated support for exploration of the design space of possible designs and verifying their properties vs. requirements. The META design tool chain is being developed to support this goal. It provides an integration framework for components, designs, design spaces, requirements, and test benches, as well as verification of requirements for the generated design models during design exploration

This paper gives an overview of the META tools and their integration with OpenModelica. The integrated environment currently has four main uses of OpenModelica: importing Modelica models into the META tool model structure, performing simulations within test benches, analyzing Modelica models and automatically adding fault modes, and extracting equations (DAEs) for formal verification tools, e.g. the QRM using qualitative reasoning.

A prototype of the integrated tool framework is in operation, being able to generate and simulate thou-sands of designs in an automated manner.

