An Aeronautic Case Study for Requirement Formalization and Automated Model Composition in Modelica

Wladimir Schamai[1] Lena Buffoni[3] Nicolas Albarello[2] Pablo Fontes De Miranda[2] Peter Fritzson[3]

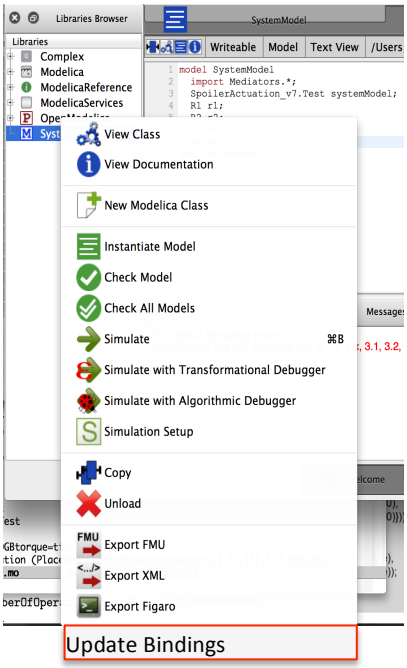
[1]Airbus Group Innovations, Germany wladimir.schamai@airbus.com
[2]Airbus Group Innovations, France {pablo.fontes-de-miranda, nicolas.albarello}@airbus.com
[3]IDA, Linköping University, Sweden, {lena.buffoni,peter.fritzson}@liu.se

Building complex systems from models that have been developed separately without modifying existing code is a challenging task faced on a regular basis in multiple contexts including design verification. To address this issue an approach has been developed for automating dynamic system model composition by defining the minimum set of information that is necessary to the composition process. A design and implementation of this approach for standard Modelica is presented in the context of an application case study – the verification of a new design for spoiler activation against requirements.

The binding approach does not assume prior knowledge of each other by the respective models and therefore increases decoupling and allows reuse of existing models and libraries. As mediators can be defined in several steps this means that different people can provide the information necessary to connect the models at different stages in the design process. Furthermore, it enables a formal traceability between client and provider models. For example, determining which requirements are implemented in the system design model at hand can be achieved by looking at the bindings for mandatory requirement clients.

In this paper we describe:

- A new application of requirement verification on an industrial case study in the field of aeronautics
- The use of the new Requirement Modeling library for modeling the requirements of the case study.
- A modified version of the syntax for representing mediators that is fully compliant with standard Modelica syntax, meaning that the bindings can be edited and visualized in any Modelica tool.
- An implementation of the algorithm for binding generation described in *(Schamai, 2014)* in OpenModelica.



References

Wladimir Schamai, Lena Buffoni, and Peter Fritzson, An Approach to Automated Model Composition Illustrated in the Context of Design Verification. *Journal of Modeling, Identification and Control*, Volume 35- 2, pages 79—91, 2014.