Integrated SysML and Modelica Modeling Workflow

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Abstract. Efforts are underway to bridge the gaps that exist between systems models used in MBSE and numerical simulation models used for other forms of model-based engineering. Implementations of interface standards like the Functional Mockup Interface (FMI) provide a means for integrating executable models across disparate simulation platforms. Translation standards like the SysML Extension for Physical Interaction and Signal Flow Simulation (SysPhS) provide guidance for the direct translation of models and model components between modeling languages. The recent implementation of new standards-based translation features to Cameo Systems Modeler enables the development of closely integrated physics-based and simulation models.

This presentation will introduce methods for integrated systems and numerical modeling using Cameo Systems Modeler and Dymola. An overview will be provided of the leveraged standards and software capabilities. Bidirectional translation of model elements between the SysML and Modelica environments will be demonstrated. Integrated simulation using Dymola numerical solvers in conjunction with Cameo simulation and model evaluation features will be shown. Finally, a combined workflow for the development of closely integrated and directly translatable models that combine the strengths of both modeling environments will be presented. This integration accelerates the development of simulable models from a candidate system design, which in turn streamlines and improves the processes of validation, verification, and evaluation of design models by close, early integration with physics-based simulation.

Biography

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Brian Baillie is a PhD Candidate in the Department of Chemical and Biomolecular Engineering at the University of Connecticut and a Graduate Fellow in the UTC Institute of Advanced Systems Engineering. His research scope is the development of methods to develop, validate, simplify, and integrate models at various levels of abstraction; in order to accelerate the process of designing and analyzing novel systems.