An Open-Source Graphical Composite Modeling Editor and Simulation Tool Based on FMI and TLM Co-Simulation

Alachew Mengist[1] Adeel Asghar[1] Adrian Pop[1] Peter Fritzson[1] Willi Braun[2] Alexander Siemers[3] Dag Fritzson[3]

[1] PELAB – Programming Environment Lab, Dept. Computer Science, Linköping University, Sweden,
{alachew.mengist,adeel.asghar,adrian.pop,peter.fritzson}@liu.se
[2]Dept. Mathematics and Engineering, University of Applied Sciences, Germany,
willi.braun@fh-bielefeld.de
[3]SKF, Göteborg, Sweden, {alexander.siemers,dag.fritzson}@skf.com

A common situation in industry is that a system model (here a composite model) is composed of several sub-models which may have been developed using different tools. FMI is one important technology for exporting/importing models between tools and/or connecting them via co-simulation. TLM based modeling and co-simulation is another important technique for modeling, connecting, and simulation of especially mechanical systems, which is simple, numerically stable, and efficient. A number of tool-specific simulation models, such as Modelica models, SimuLink models, Adams models, BEAST models, etc., have successfully been connected and simulated using TLM based co-simulation (Siemers et al, 2005). However, previously there was no general open source tool for creation, graphic editing, and simulation of composite models connected via FMI or TLM based co-simulation. In this paper we present a graphical composite model editor, shown in Figure 1, based on OpenModelica which is integrated with the OpenModelica and the SKF TLM co-simulation frameworks to support both FMI and TLM based composite model editing and simulation.

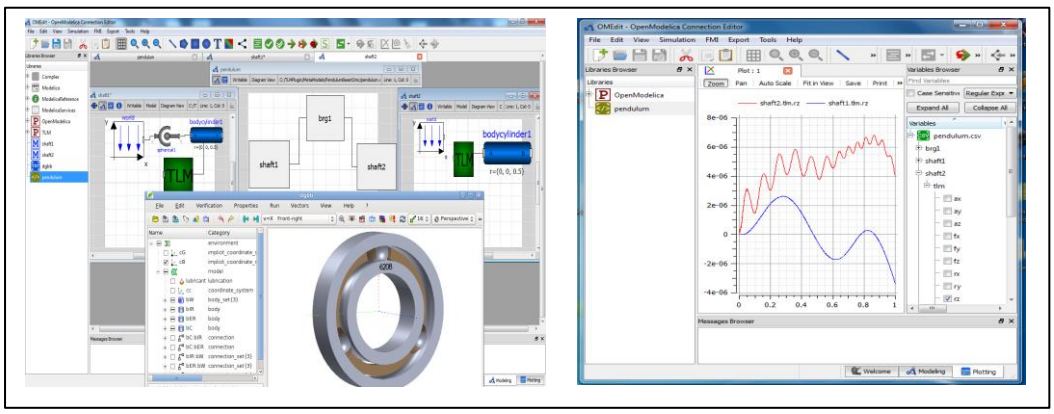

Figure 1. Graphical composite model editor.

The editor supports creating, viewing and editing a composite model both in textual and graphical representation. The system supports simulation of composite models consisting of sub-models created using different tools.

References

Alexander Siemers, Iakov Nakhimovski, and Dag Fritzson. Meta-modelling of Mechanical Systems with Transmission Line Joints in Modelica. In *Proceedings of the 4th International Modelica Conference*, Hamburg, Germany, 2005.