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Author: Mr. Xu Dai  
McGill University, Canada, xu.dai@mail.mcgill.ca

Mr. Ali Raoofian  
McGill University, Canada, ali.raoofian@mail.mcgill.ca

Prof. Jozsef Kovecses  
McGill University, Canada, jozsef.kovecses@mcgill.ca

Mr. Marek Teichmann  
CMLabs Simulations, Inc., Canada, marek@cm-labs.com

## CO-SIMULATION OF SPACE ROBOTIC CONTACT TASKS USING REDUCED FLEXIBLE MODEL

**Abstract**

We propose a novel, model-based coupling scheme for co-simulation of a flexible space robot model where the non-smooth subsystem is separated from the rest of the robotic system. For this subsystem, the detailed contact dynamics formulation is developed. This subsystem is then interfaced with the flexible model of the rest of the robotic system through a noniterative co-simulation setup where only reduced-order interface models are communicated between the subsystems at the interface. This technique significantly improves the accuracy and stability of the overall simulation.

An important aspect of the proposed approach is the development of the reduced-order interface model for the space robot subsystem that generally represents a structure-varying, flexible mechanical system which is interfaced with a non-smooth subsystem.

We illustrate the results in the simulation of the robotic manipulator of the International Space Station, and also demonstrate the capability of our approach compared to rigid reduced interface modelling.