

Software Lab

Modeling: ★★☆☆☆
 Mathematics: ★☆☆☆☆
 Programming: ★★★★★

Implementation and evaluation of FMI interface for FSI simulations.

Introduction

Simulation of complex coupled systems usually makes use of different simulation approaches, for example multi body dynamics, finite element or finite volume, finite cell approaches. These simulation tools usually need data from each other at/on discrete points in time and/or space to carry on their respective simulations (usually independent). Transfer of such data for co-simulations like FSI (Fluid-Structure Interaction), which involves only two tools can already become complicated and implementation specific. To reduce the complications of such data transfer, in 2010 the standard of FMI (Functional Mockup Interface) is introduced.

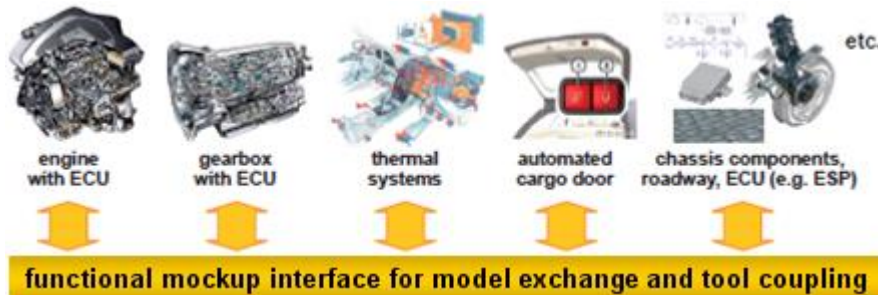


Illustration of FMI usage (Source: <https://www.fmi-standard.org>)

Functional Mockup Interface (FMI) is a standard for communication between different simulation tools. “The intention is to provide an interface standard for coupling two or more simulation tools in a co-simulation environment.”(Source: www.fmi-standard.org). Considering an increasing number of solvers/tools supporting an interface with python, and the easy usage of python, this project intends to provide an insight into the FMI standards in python by implementing this standard for python based application.

Tasks

- Study FMI standard implementation for python.
- Implement FMI standard communication for python clients (source will be provided).
- Extend the implementation to include clients from different programming languages (C/C++ and MATLAB®).
- Implement FMI interface for existing python based fluid solver (source will be provided) and test it using a FSI benchmark simulation.

Supervisors

1. Aditya Ghantasala, Lehrstuhl für Statik, aditya.ghantasala@tum.de
2. Altug Emiroglu, Lehrstuhl für Statik, altug.emiroglu@tum.de