OMSimulator v2.0

Model-exchange, Co-simulation, TLM, SSP, and Applications
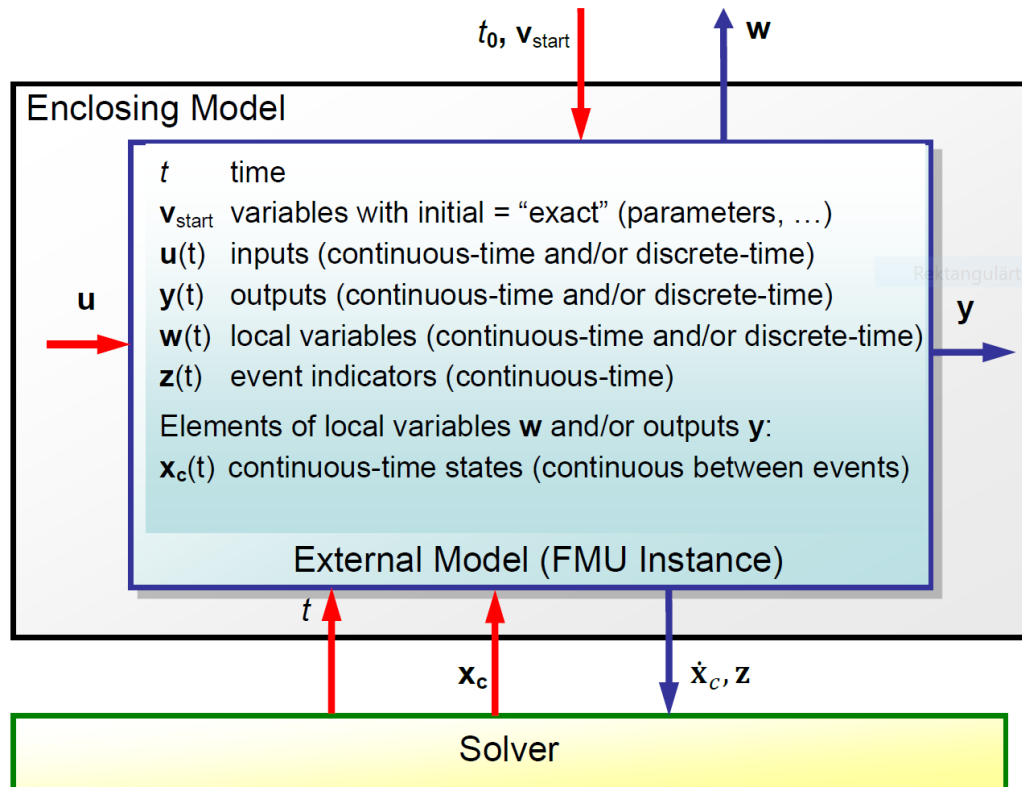
Lennart Ochel

11th OpenModelica Annual Workshop, February 4, 2019

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OpenModelica Environment

- provides...
  - a rich modelling environment
  - symbolic transformations
  - efficient simulation runtime
  - FMI export

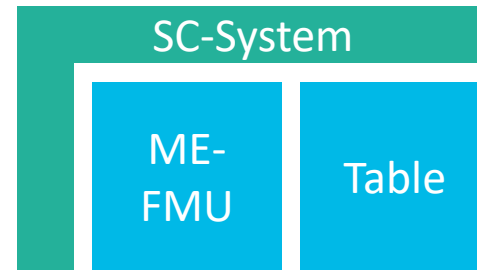- is missing...
  - a (co-)simulation environment
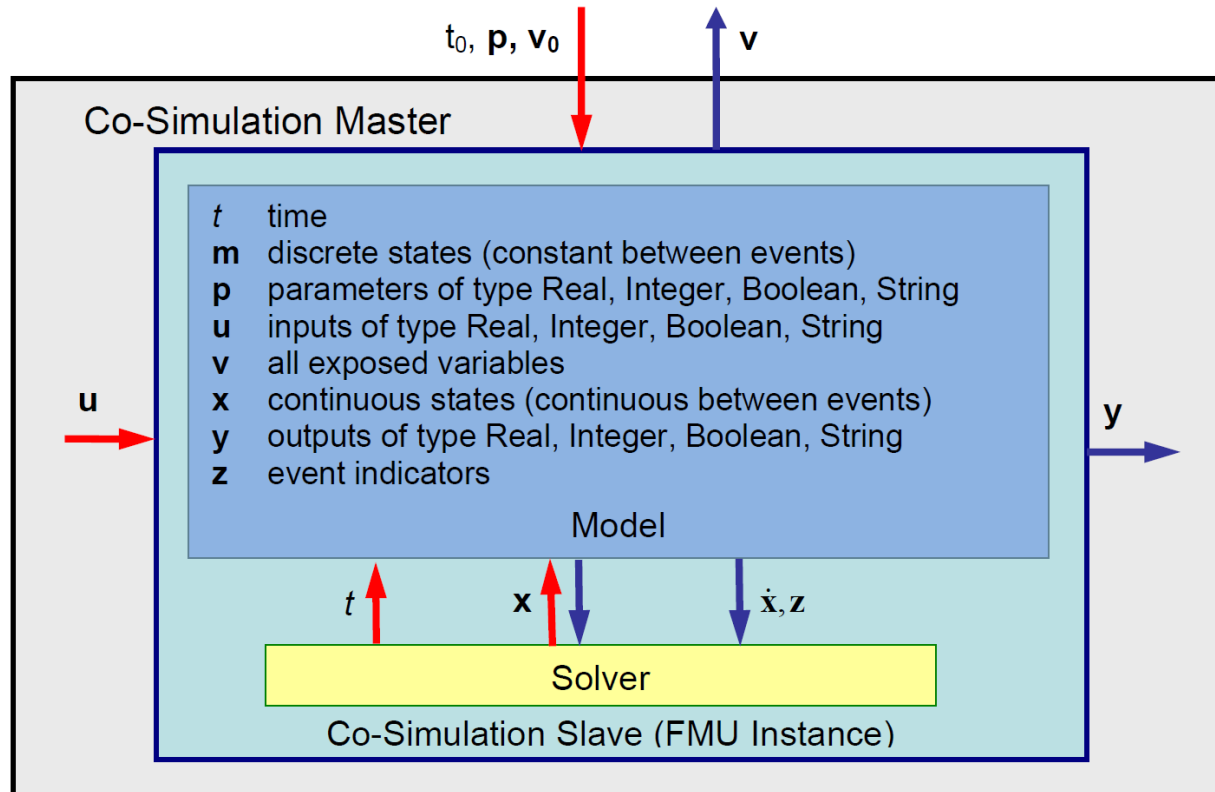
FMI for Model Exchange

Functional Mock-up Interface for Model Exchange and Co-Simulation, Section 3

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Composite Model Structure (I)

- Strongly Connected System
    - direct communication schema
- Detecting and handling algebraic loops
- Integration methods
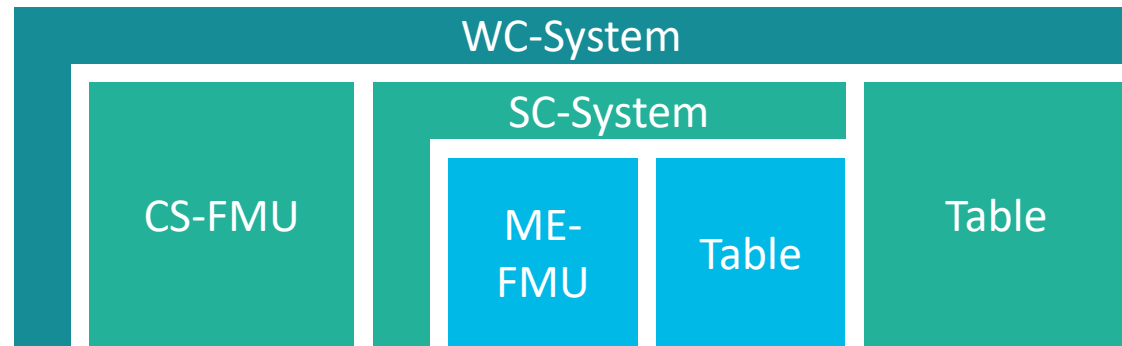   - Explicit euler
    - Cvode

FMI for Co-Simulation

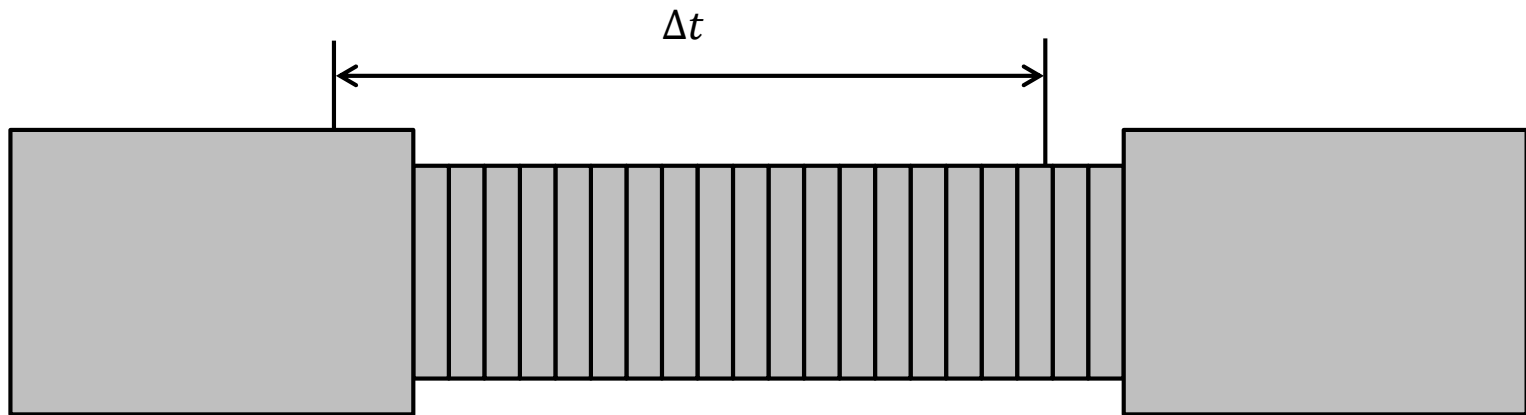Functional Mock-up Interface for Model Exchange and Co-Simulation, Section 4

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Composite Model Structure (II)

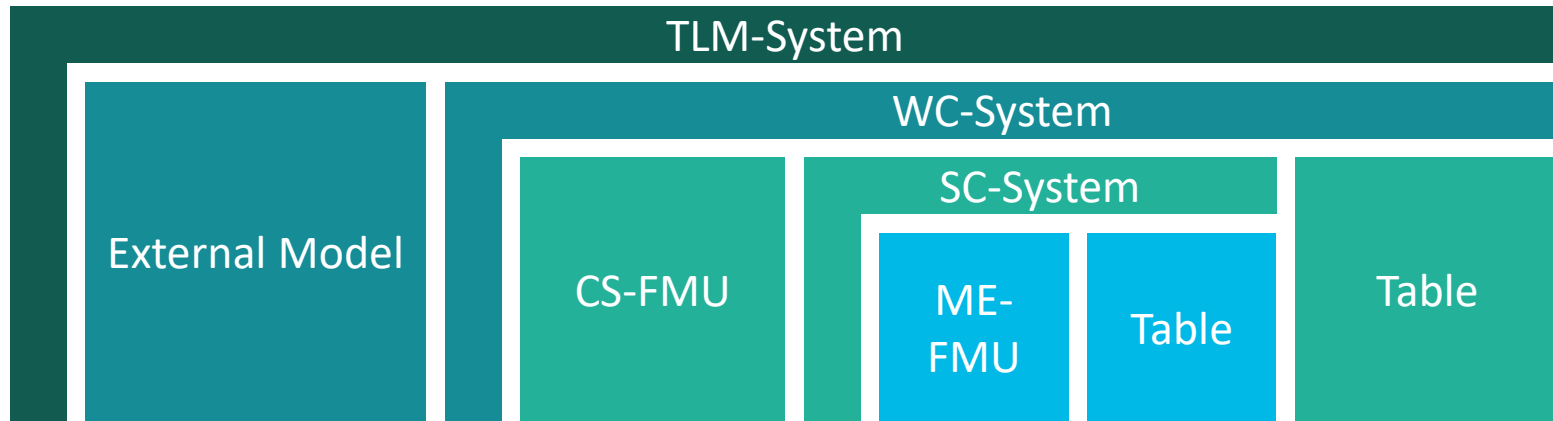| WC-System				
	CS-FMU	SC-System		Table
		ME-FMU	Table	

- Weakly connected system
  - Communication at communication time points
  - Extrapolation of inputs

Transmission-line Modelling

• Technique which considers physical property of signals

Composite Model Structure (III)

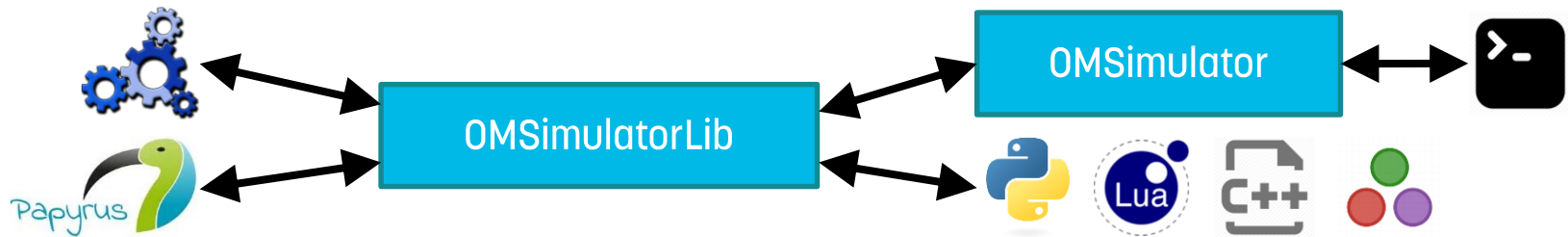- Transmission Line Modelling
  - Physical signal connections

MODPROD Session 2b:
"Numerically Robust FMI
Co-simulation using TLM
with OMSimulator"

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System Structure and Parameterization

- Status: 1.0-RC1 (January 21, 2019)
- Tool independent standard for
  - FMU-based model composition
  - FMU parameterization

- Missing...
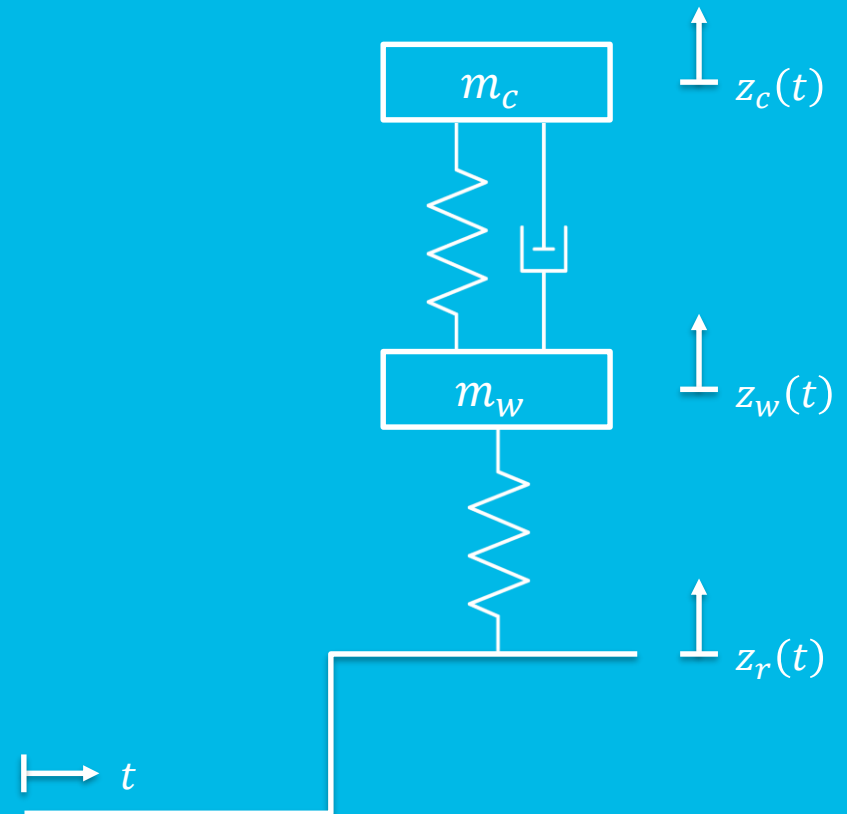 - Simulation information (solvers etc.)
  - Buses, Tables

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User Interface

- Command-line interface
- Scripting interface
- Graphical interface

Demo

Quarter Car Model

Summary

- OMSimulator v2.0 is now available
  - OpenModelica v1.13.2
- Strongly-Coupled System
  - Direct communication schema
- Weakly-Coupled Systems
  - Input extrapolation
- TLM-Systems

```
hudson@dev ~/OMSimulator [maintenance/v2.0]
> git shortlog -s
    69  Adeel Asghar
    78  Adrian Pop
     2  Anatoly Trosinenko
    49  Bernhard Thiele
     1  HYu
     1  Lena Buffoni
   582  Lennart Ochel
    21  Martin Sjölund
     3  Rebeka Farkas
   187  Robert Braun
     1  arun3688
     1  hkiel
     3  hudson
```