AVSIMULATION

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FMI Handler

FMI HANDLER

Functional Mock-up Interface (FMI) is a tool independent standard to support both model exchange and

co-simulation of dynamic models using a combination of xml-files and compiled C-code.

FMI for Model Exchange:

- Import and export of input/output blocks.
- FMU can be large (e.g. 100000 variables)
- FMU can be used in an embedded system
- FMUs can be connected together

FMI for Co-Simulation:

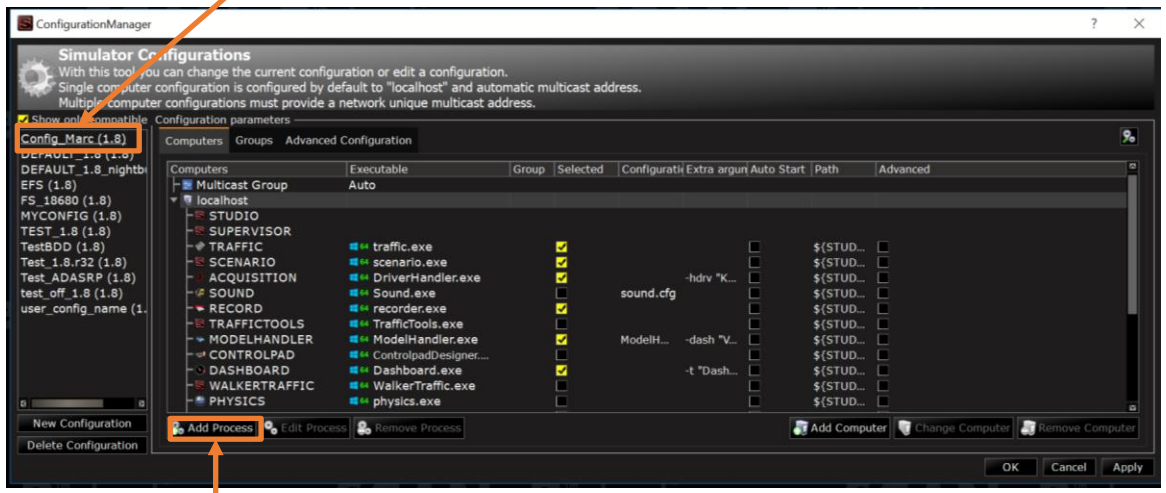
- Coupling of several simulation tools
- Each tool treats one part of a modular coupled problem
- Data exchange is restricted to discrete communication points
- Subsystems are solved independently between communication points

FMI HANDLER

Location

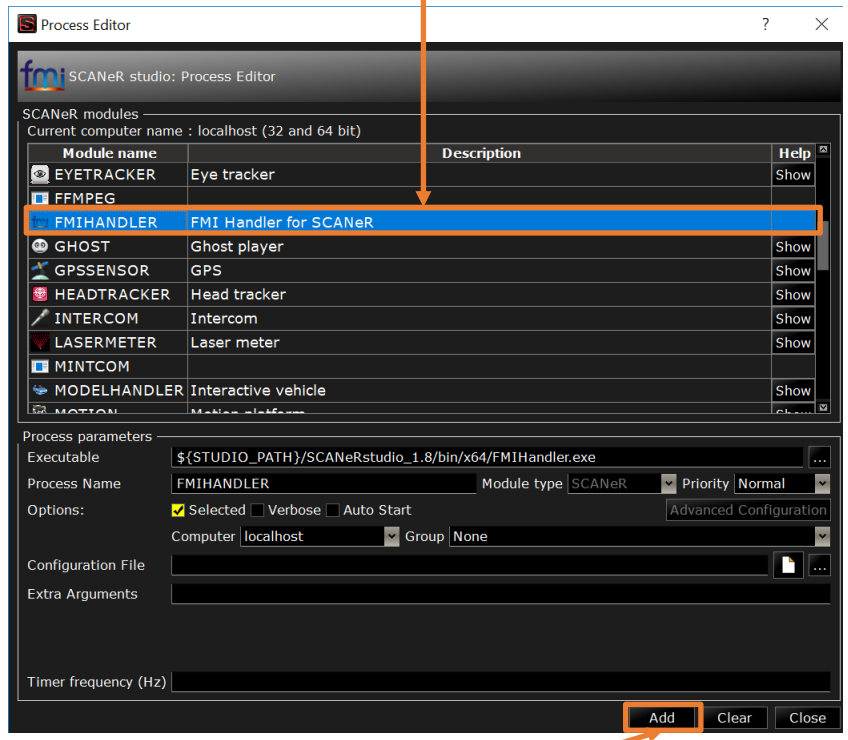
Add FMIHandler.exe to your configuration

1 - Select your configuration



2 – Add a new process

3 – Select FMI Handler

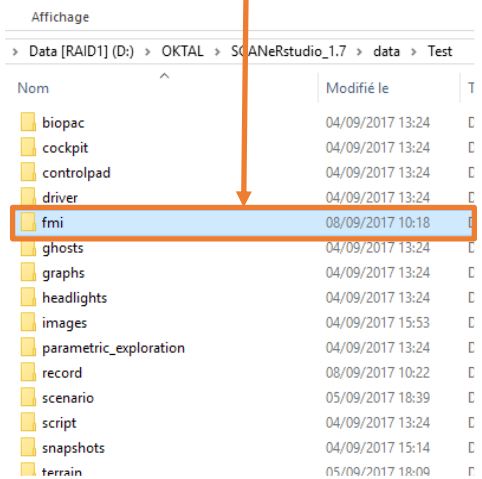


4 – Add it

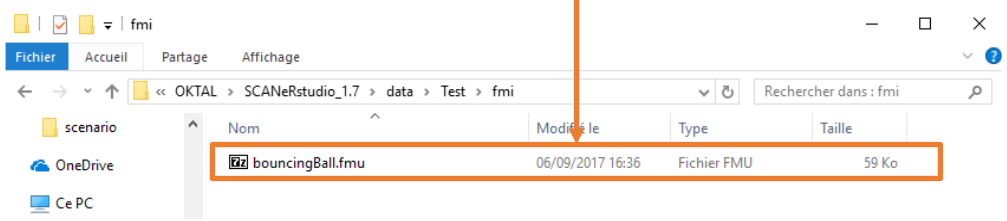
FMI HANDLER

Create FMI folder

1 – Create a new folder : name it « fmi »



2 – Put in the fmu file



The bouncingBall file implements the following equation:

- der(h) = v;
- der(v) = -g;
- when h<0 then v:= -e* v

with start values h=1, e=0.7, g = 9.81 and

- h: height [m], used as state
- v: velocity of ball [m/s], used as state
- der(h): velocity of ball [m/s]
- der(v): acceleration of ball [m/s2]
- g: acceleration of gravity [m/s2], a parameter
- e: a dimensionless parameter

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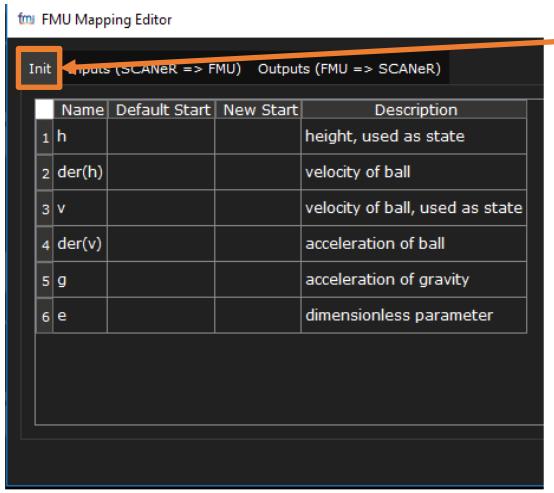
FMI tab & Mapping Editor

Right click on the fmu file and select « Edit »



Init tab : Names and descriptions of each variables

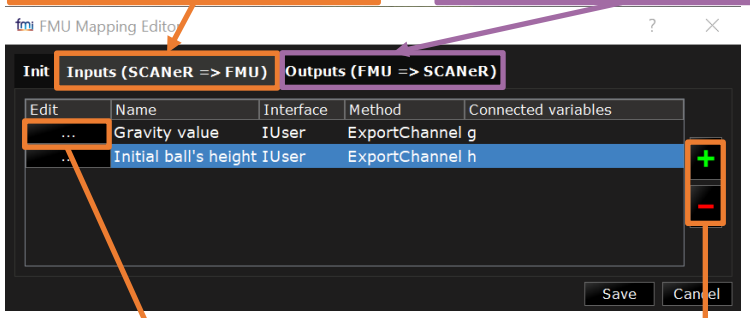
A simulator may run many FMUs in a single simulation run or multiple instances of one FMU. The inputs and outputs of these FMUs can be connected with direct feed through (Export channel, User input...).

FMI HANDLER

Mapping Editor & Message Pattern Editor

Inputs tab : Define the inputs values for your FMI variables

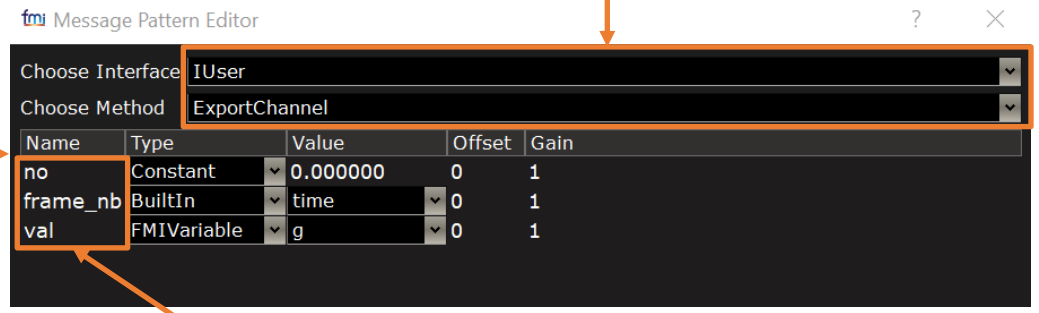
Outputs tab : Define the outputs values for your FMI



Click on « … » to edit your input and access to the « Message Pattern Editor »

Add or remove an input

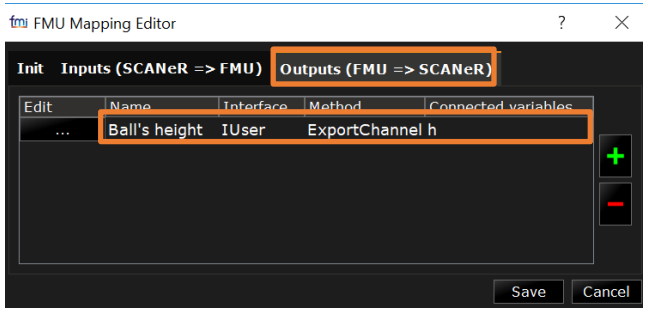
Interfaces & Methods : Define in the network.html



- Export channel number
- Frame number
- Variable which will take the export channel's value

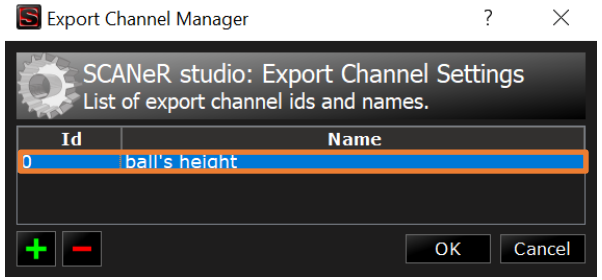
FMI HANDLER

Mapping Editor : Example for bouncingBall_cs.fmu



We define 1 output (Current height) which will use the ExportChannel method in IUser interface.
We should define the ExportChannel in the Export Channel Manager (Explanation beside)

Click on the « Configuration » tab on the top left corner of your screen, then select the « Export Channel Manager »



We define 1 Export Channel

Then we can look at the ControlPad to see the message in the export channels.

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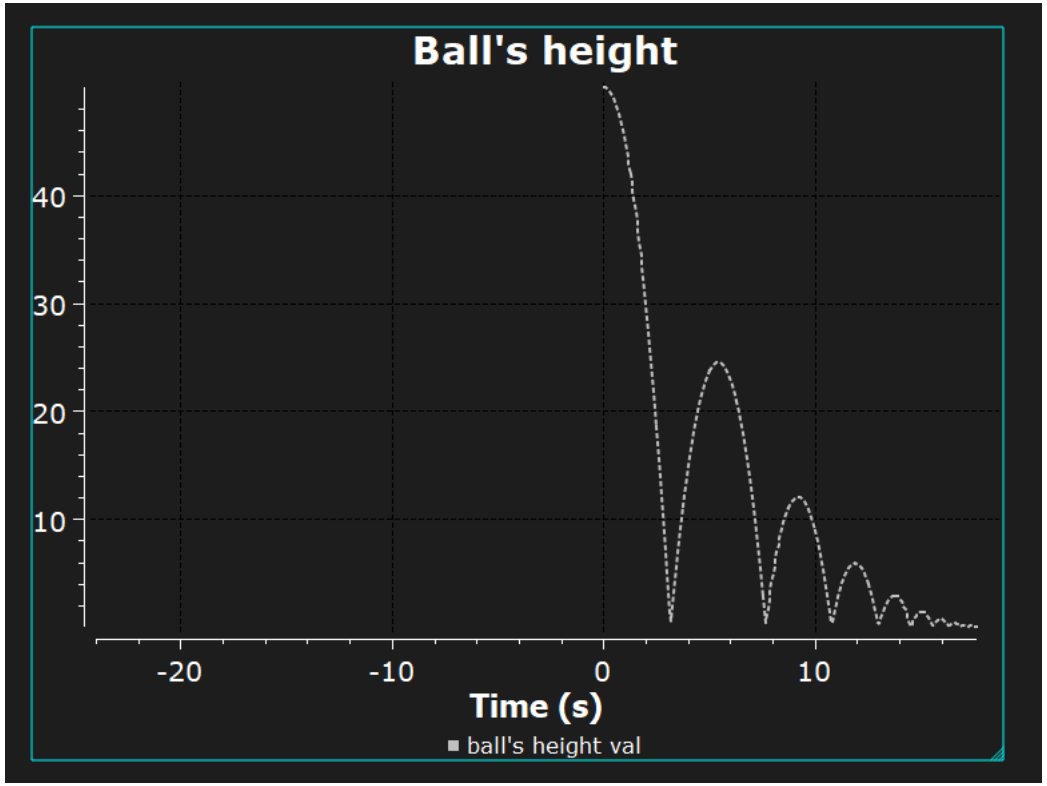
Example for bouncingBall_cs.fmu : Visualization in ControlPad



1. Open a new file in your ControlPad window
2. Drag and drop a plotter from your toolbox widget
3. Define the properties of your plotter :

- Select Auto-scale
- Check « Use SCANeR simulation time »
- Select 20Hz as « Refresh rate »

Europe Office
1, Cours de l’Ile Seguin
92650 Boulogne - Billancourt
+ 33 1 46 94 97 40