



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

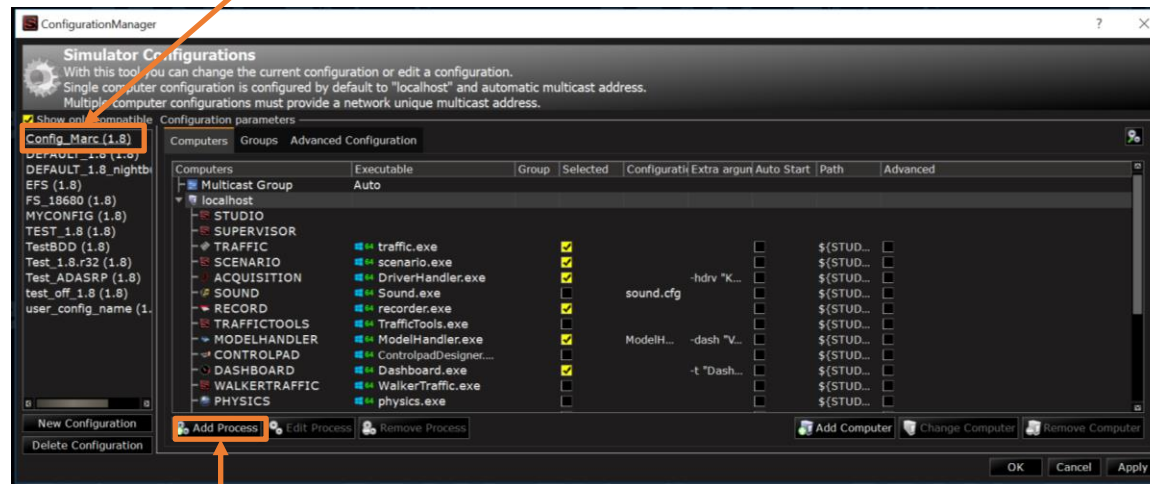


FMI HANDLER

Location

Add FMHandler.exe to your configuration

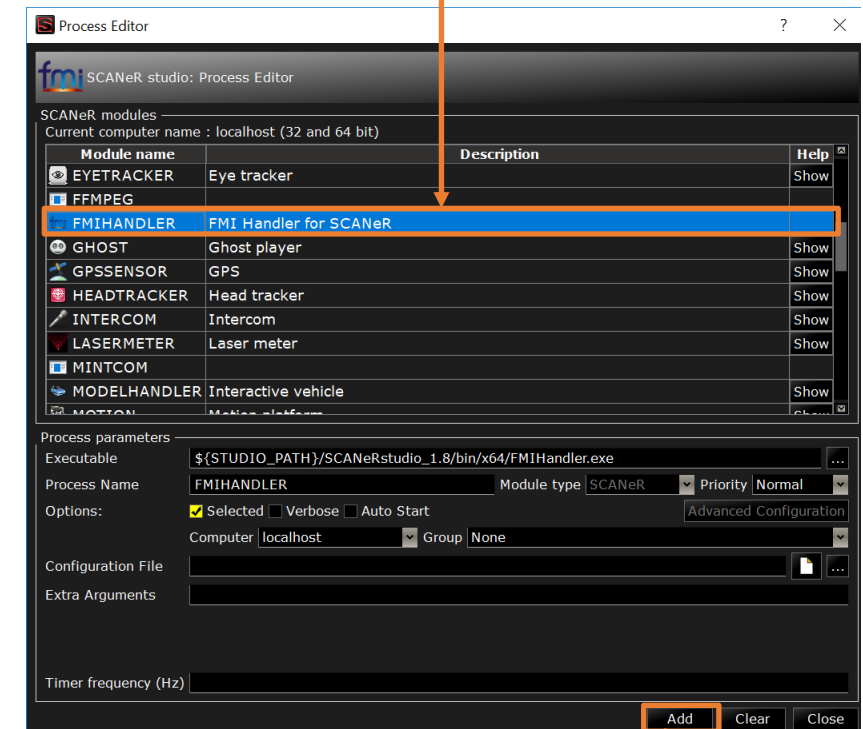
1 - Select your configuration



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 »

Affichage

> Data [RAID1] (D:) > OKTAL > SCANeRstudio_1.7 > data > Test

Nom	Modifié le	T
biopac	04/09/2017 13:24	C
cockpit	04/09/2017 13:24	C
controlpad	04/09/2017 13:24	C
driver	04/09/2017 13:24	C
fmi	08/09/2017 10:18	C
ghosts	04/09/2017 13:24	C
graphs	04/09/2017 13:24	C
headlights	04/09/2017 13:24	C
images	04/09/2017 15:53	C
parametric_exploration	04/09/2017 13:24	C
record	08/09/2017 10:22	C
scenario	05/09/2017 18:39	C
script	04/09/2017 13:24	C
snapshots	04/09/2017 15:14	C
terrain	05/09/2017 18:09	C



2 – Put in the fmu file

Fichier | Accueil | Partage | Affichage

< > << >> OKTAL > SCANeRstudio_1.7 > data > Test > fmi

Rechercher dans : fmi

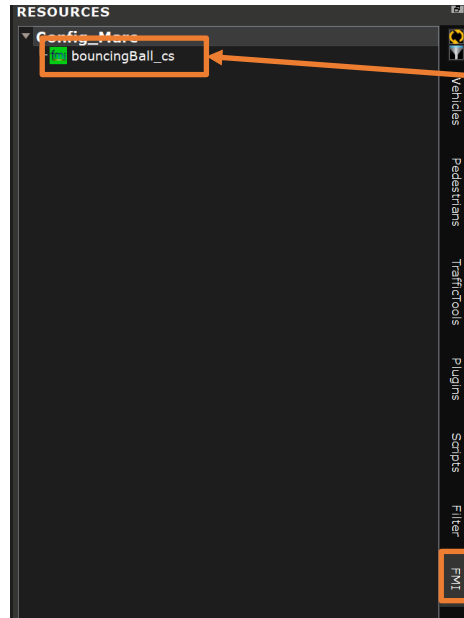
Nom	Modifié le	Type	Taille
bouncingBall.fmu	06/09/2017 16:36	Fichier FMU	59 Ko

The bouncingBall file implements the following equation:

- $\text{der}(h) = v$;
 - $\text{der}(v) = -g$;
 - 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
 - $\text{der}(h)$: velocity of ball [m/s]
 - $\text{der}(v)$: 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 »



fmi FMU Mapping Editor

Init Inputs (SCANer => FMU) Outputs (FMU => SCANer)

	Name	Default Start	New Start	Description
1	h			height, used as state
2	der(h)			velocity of ball
3	v			velocity of ball, used as state
4	der(v)			acceleration of ball
5	g			acceleration of gravity
6	e			dimensionless parameter

Init tab : Names and descriptions of each variables

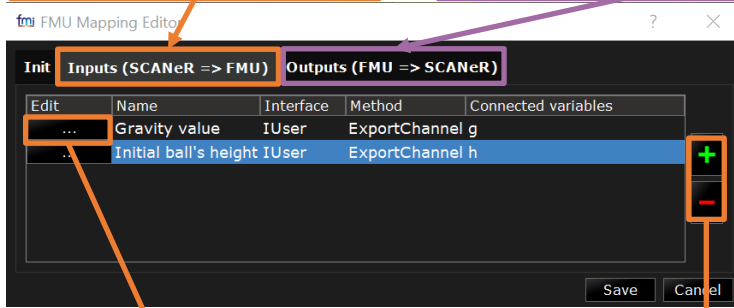
A simulator may run many FMUs in a single simulation run or multiple instances of one FMU. The inputs and outputs of these FMUs can be connected with direct feed through (Export channel, User input...).

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Mapping Editor & Message Pattern Editor

Inputs tab : Define the inputs values for your FMI variables

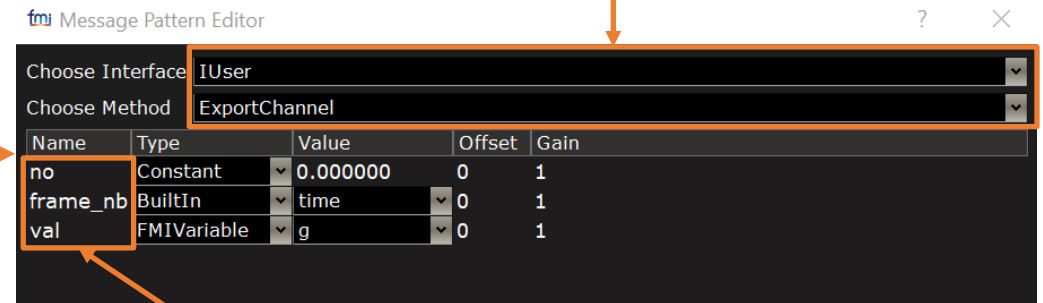
Outputs tab : Define the outputs values for your FMI



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

Add or remove an input

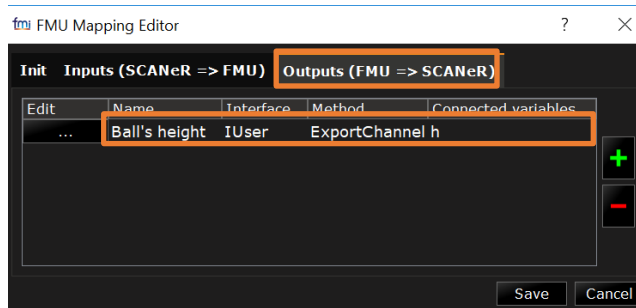
Interfaces & Methods : Define in the network.html



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

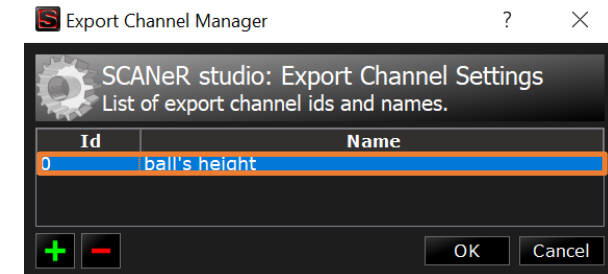
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Mapping Editor : Example for bouncingBall_cs.fmu



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 »

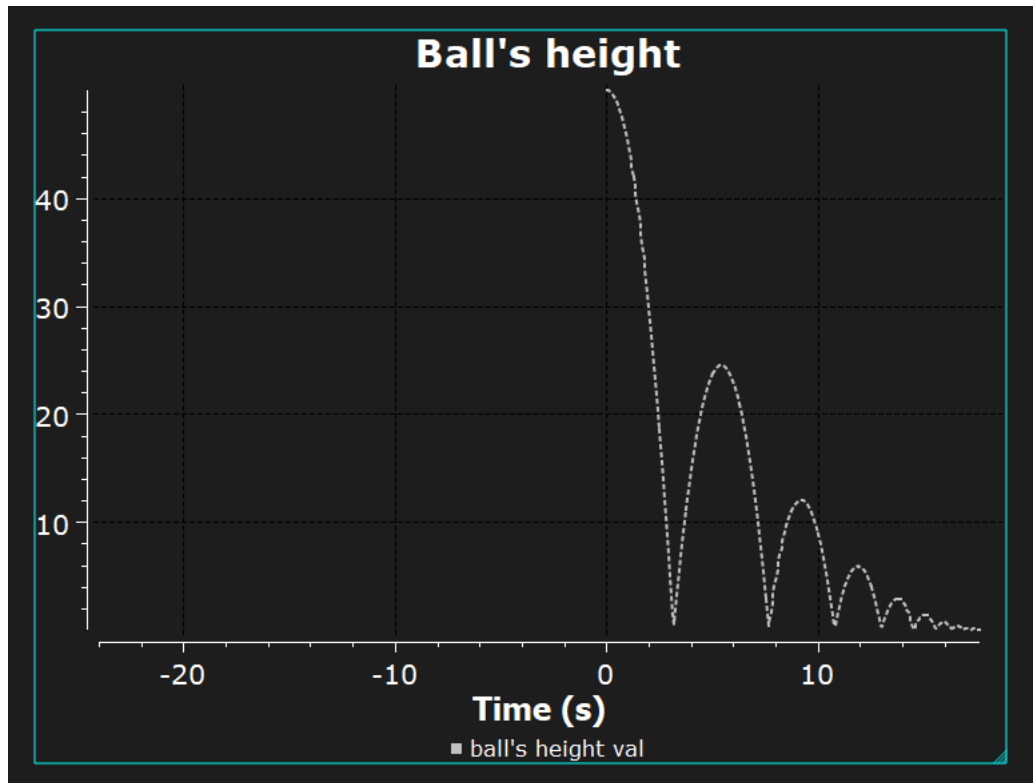


We define 1 Export Channel

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 »

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