

Dymola 2012 FD01

Release Highlights



www.cenit.de
www.cenit-group.com

 CATIA

cenit

Executive Summary

Productivity

- Greatly improved plotting capabilities offers easier to use and more flexible analysis of simulation results.
- Improvements in graphical editor to make common operations faster.

Simulation

- More flexible composition of FMI simulation units with support of co-simulation.
- Better accuracy and simulation speed, especially for fluid systems.

Openness

- Enhanced Simulink-interface makes distribution of pre-compiled S-functions easier.
- OPC server interface to simulator facilitates integration with process control and training simulators.

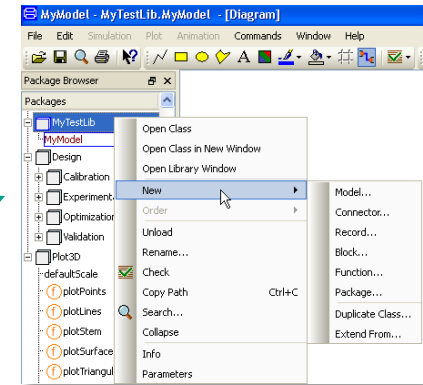
Libraries

- General flexible bodies exported from FEA can be simulated in Modelica, increasing the scope of models that can be modeled.

Main Highlights

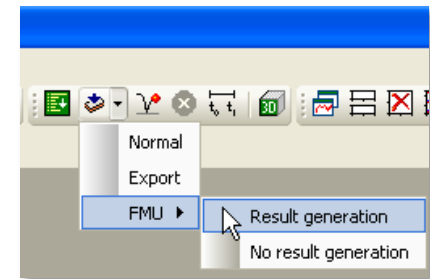
- **Improved productivity**

- Error messages for encrypted libraries
- Plotting facilities (zooming, curve highlight, ...)
- Graphical editor
 - General revision of context menus
 - Improved text editing dialog in icon and diagram layer
 - Code export and FMI import/export commands integrated in GUI
 - More settings stored between sessions



- **FMI for co-simulation**

- Improved documentation
- Support for import of Dymola-generated FMUs



- **Better simulation**

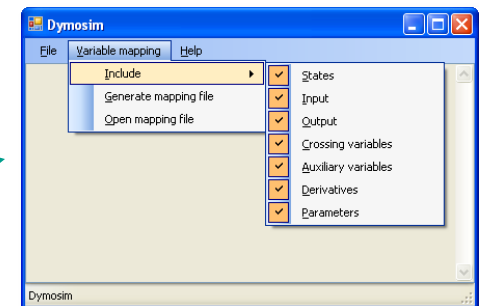
- Improved non-linear solver for equation systems (homotopy at events)
- Adaptive homotopy method (fluid systems)

- **Enhanced Simulink-interface**

- Pre-compiled DymolaBlock S-functions can be imported

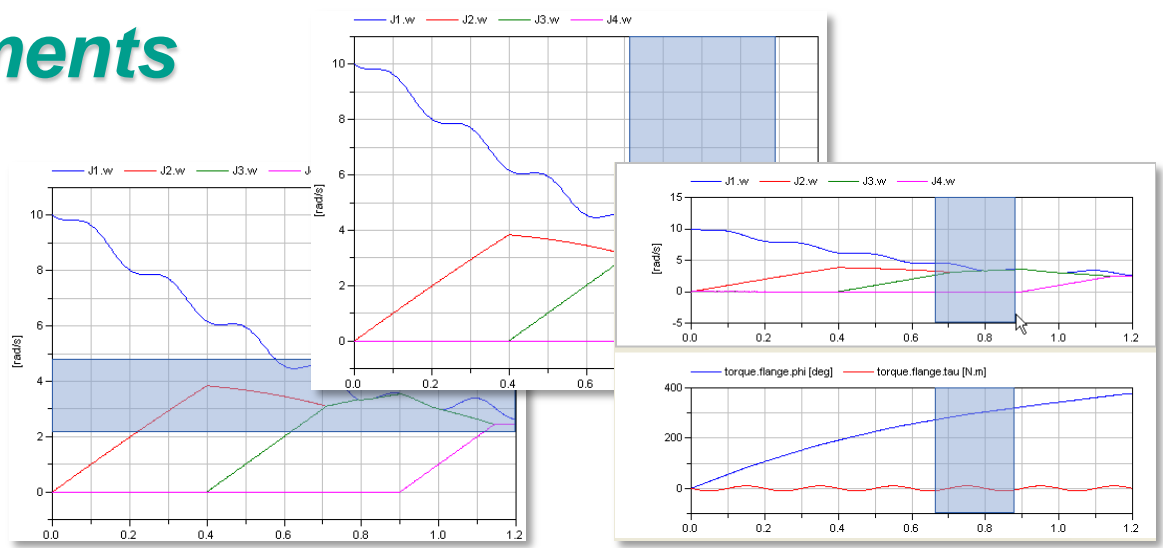
- **Simulator as OPC server (process simulation)**

- **Improved libraries**



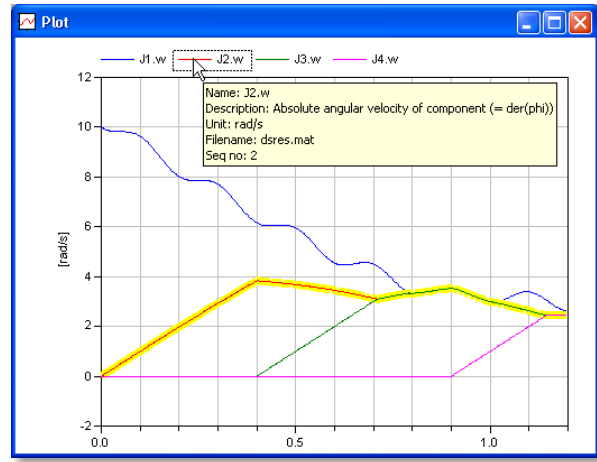
Plotting Improvements

- **Zooming**
 - Vertical
 - Horizontal
 - Time-synchronized



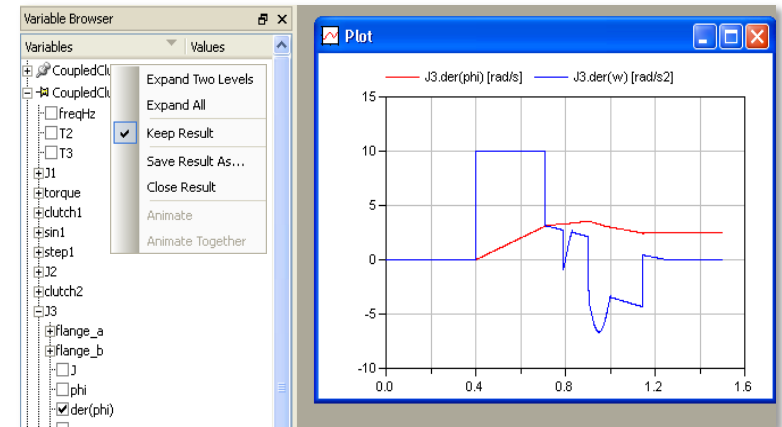
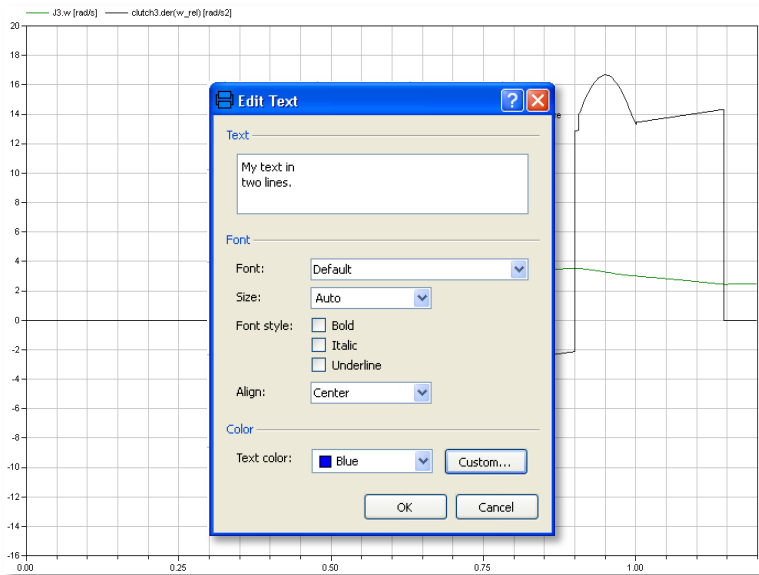
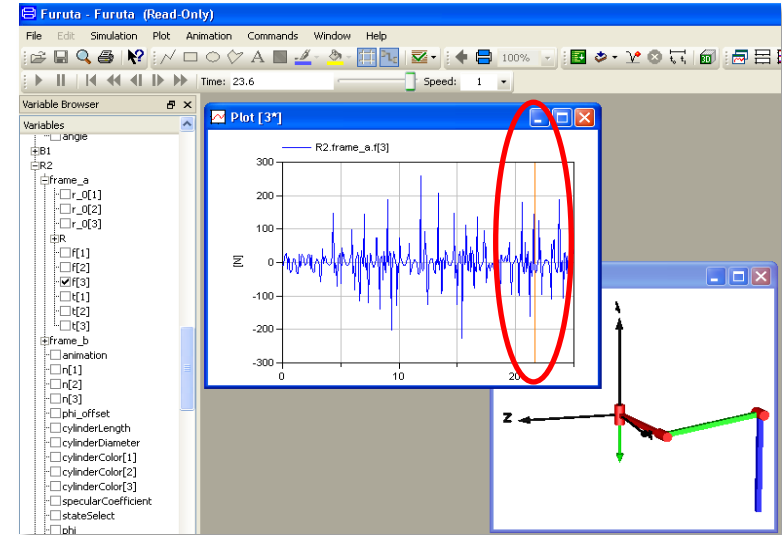
- **Curve highlighting**
- **Tooltip for legends**
- **Script support for plot display**

```
plot({"J1.w", "J2.w"},
    colors={{0,0,255}, {255,0,0}},
    patterns={LinePattern.Dash, LinePattern.Solid},
    markers={MarkerStyle.None, MarkerStyle.Cross},
    thicknesses={0.500000, 0.250000});
```



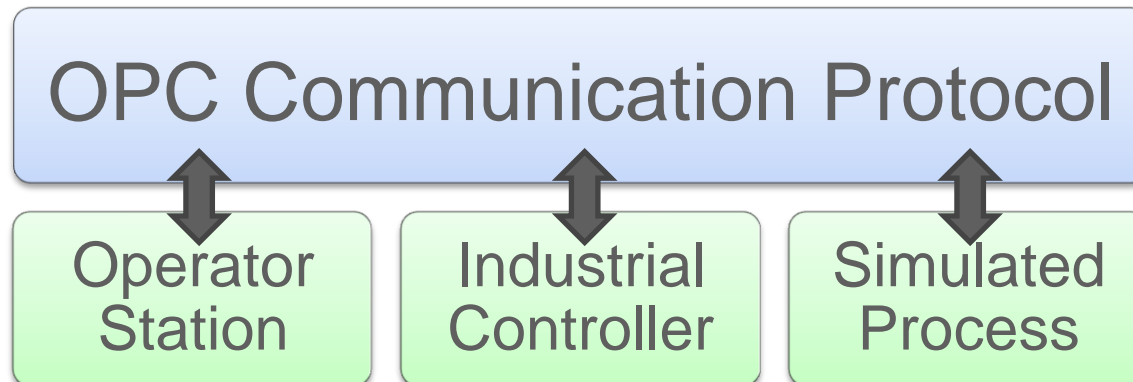
Plotting Improvements

- Simulation time-line in plot
- Insert text object in diagram
- Keep result files



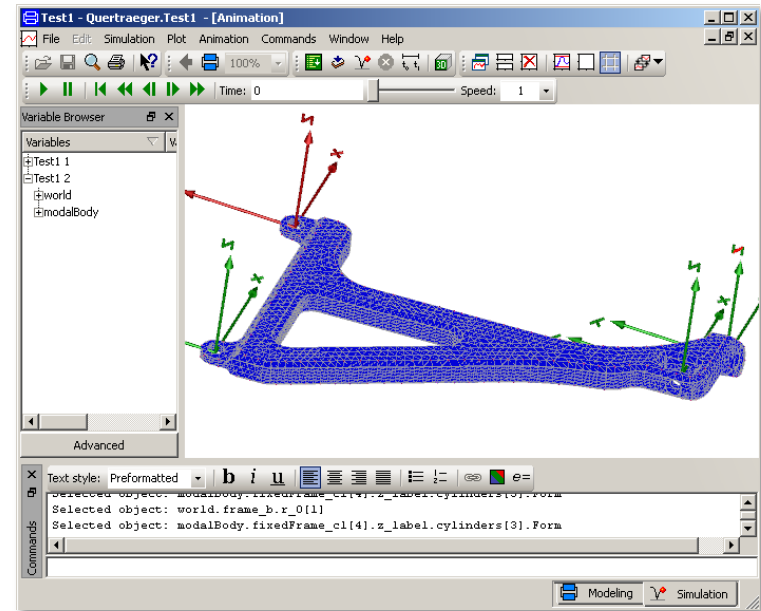
Improved Openness

- **Enhanced Simulink-interface**
 - Pre-compiled DymolaBlock S-functions can be imported
 - Makes it easier to deploy Dymola-generated models
- **Simulator as OPC server (process simulation)**
 - Process modeled in Dymola
 - Simulation executable can directly talk to control systems and operator stations via standard OPC communication protocol



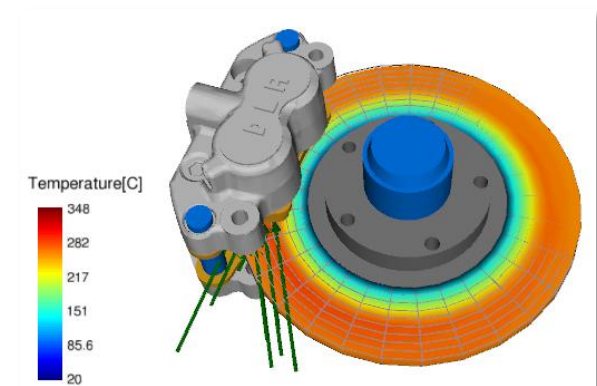
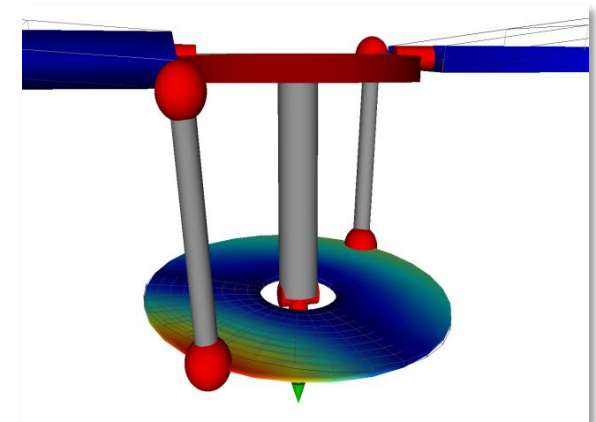
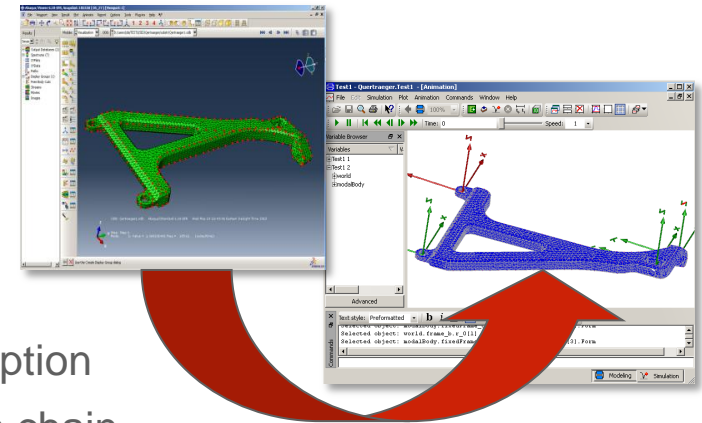
Library Improvements

- **New capabilities in FlexibleBodies library**
 - Modal bodies
 - Annular plate
 - Thermo-elastic plate
- **Improvements of existing libraries**
 - Optimization 2.0
 - PowerTrain 2.1
 - AirConditioning
 - Hydraulics



FlexibleBodies Library 2.0

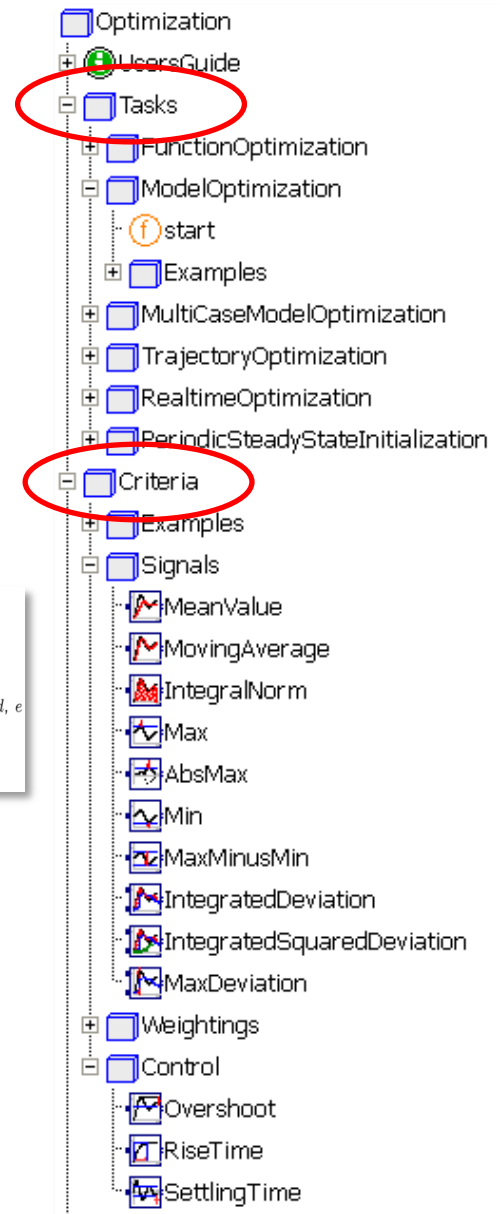
- **Beams**
 - analytic solution to common beam structures
- **ModalBody (extended support)**
 - applications: general FE-based flexible body description
 - consistent Catia-Abaqus-Dymola modeling process chain
- **AnnularPlate (new modeling class)**
 - semi-analytical modeling of annular Kirchhoff-plate (bending)
 - in arbitrary Lagrangian-Eulerian (ALE)-formulation: „rotate-with-plate-nodes“ + „slide-on-plate-nodes“
 - applications: brake squeal, machine tool, swash plate etc.
- **ThermoelasticPlate (new modeling class)**
 - variant of AnnularPlate with temperature field and thermoelastic coupling
 - applications: brake judder, hot spots etc.



Optimization Library 2.0

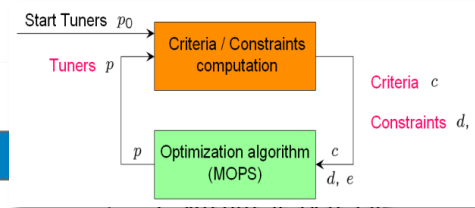
• New Features:

- Several **GUI-supported optimization tasks**
- Expanded sub-library for optimization **criteria**
- Support of **function objects (pointers)**
- Significantly enhanced **output** during optimization



Final Solution - evaluated once again (evaluation 61 of 61):

Tuner parameters	name	
	Kf	-1.405985763435730
	Ki	-2.065697610134148
	Kq	0.632750130076522



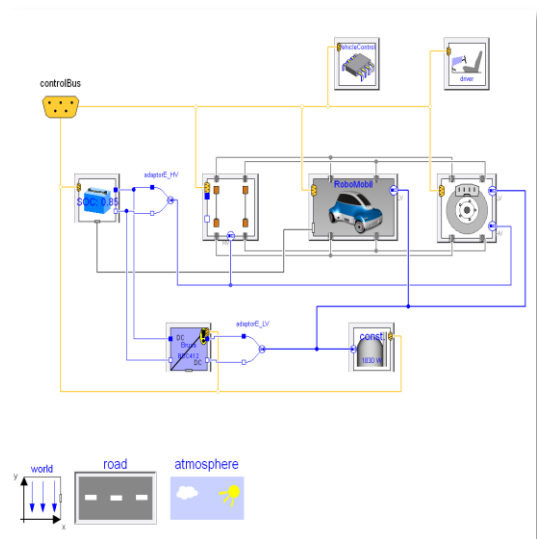
Criteria	name	scaled criteria
	overshoot	0.485809523825850
	maxElevator	0.486926696118355
	riseTime	1.382768709759114
	settlingTime	0.486966823836136
	Maximum of criteria	0.486966823836136

PowerTrain Library 2.1

- **New Features:**
 - Backwards compatible
 - Hybrid vehicles
 - Electrical vehicle (especially: fast battery and electrical motor models)
 - Improved bus (using features from Modelica 3.2)



Contact: Robomobil@dlr.de
Mr. Brembeck



- Electric research vehicle under development at DLR-RM:
- 10 electric actuators
- Wheel steering angles: 110°
- Vehicle dynamics control
- Calibrated and hardware-tested models will be included in future PowerTrain versions

Other Library Enhancements

- **AirConditioning Library**

- Support for battery cooling applications.
- Excel Interface in a separate package

- **Hydraulics Library**

- Air content in medium
- Extended database with fluids
- Reversible hydraulic cylinders
- Hydraulic resistance

