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Executive Summary

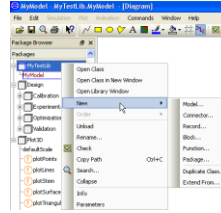
- Productivity**
 - Greatly improved plotting capabilities offers easier to use and more flexible analysis of simulation results.
 - Improvements in graphical editor to make common operations faster.
- Simulation**
 - More flexible composition of FMI simulation units with support of co-simulation.
 - 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

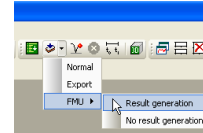
Improved productivity

- 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

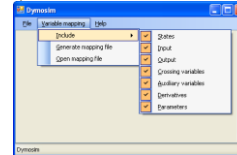


Better simulation

- 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



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Plotting Improvements

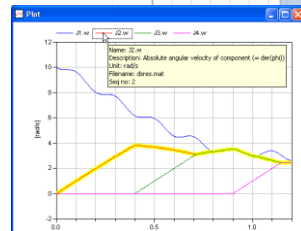
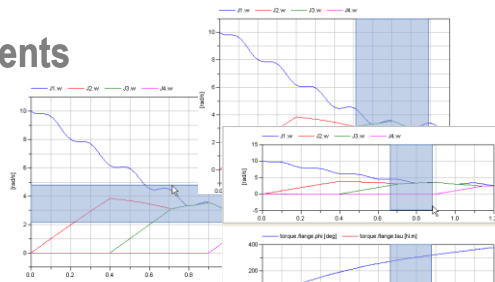
Zooming

- Vertical
- Horizontal
- Time-synchronized

Curve highlighting

Tooltip for legends

Script support for plot display



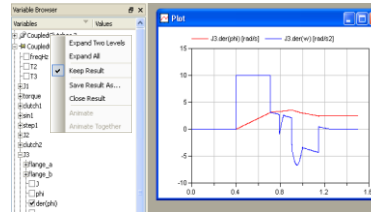
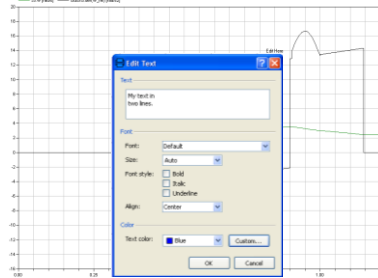
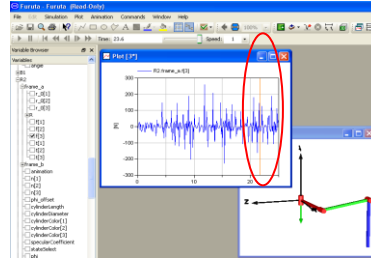
```
plot({"J1.w", "J2.w"},
    colors={{0,0,255}, {255,0,0}},
    patterns={LinePattern.Dash, LinePattern.Solid},
    markers={MarkerStyle.None, MarkerStyle.Cross},
    thicknesses={0.500000, 0.250000});
```



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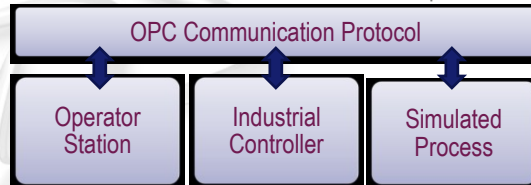
Plotting Improvements

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



Improved Openness

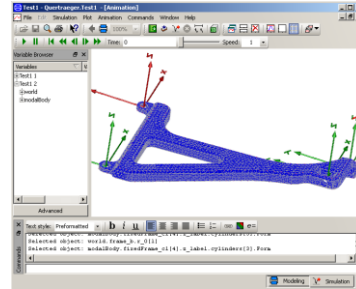
- Enhanced Simulink-interface
 - Pre-compiled DymolaBlock S-functions can be imported
 - Makes it easier to deploy Dymola-generated models
- Simulator as OPC server (process simulation)
 - Process modeled in Dymola
 - Simulation executable can directly talk to control systems and operator stations via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



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FlexibleBodies Library 2.0

Beams

- analytic solution to common beam structures

ModalBody (extended support)

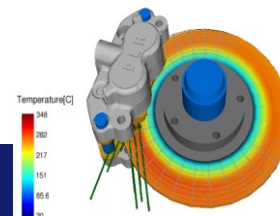
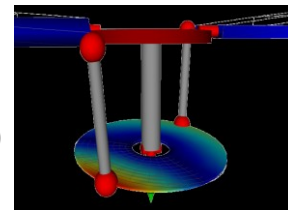
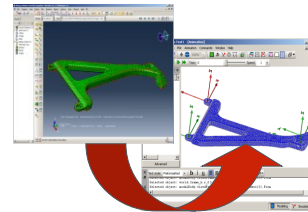
- applications: general FE-based flexible body description
- consistent Catia-Abaqus-Dymola modeling process chain

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.

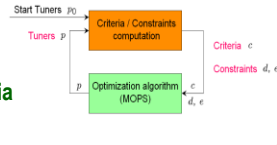


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Optimization Library 2.0

New Features:

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



- Optimization
- UsersGuide
- Tasks**
- FunctionOptimization
- ModelOptimization
- start
- Examples
- MultiCaseModelOptimization
- TrajectoryOptimization
- RealtimeOptimization
- PeriodicSteadyStateInitialization
- Criteria**
- Examples
- Signals
- MeanValue
- MovingAverage
- IntegralNorm
- Max
- AbsMax
- Min
- MaxMinusMin
- IntegratedDeviation
- IntegratedSquaredDeviation
- MaxDeviation
- Weightings
- Control
- Overshoot
- RiseTime
- SettlingTime

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

Tuner parameters		
	name	value
	Kf	-1.405985763435730
	K	-2.065697610134146
	Kq	0.632750130076522

Criteria		
	name	scaled criteria
	overshoot	0.485809523825850
	maxElevator	0.486926696118355
	riseTime	1.382768709759111
	settlingTime	0.486966823836136
	Maximum of criteria	0.486966823836136



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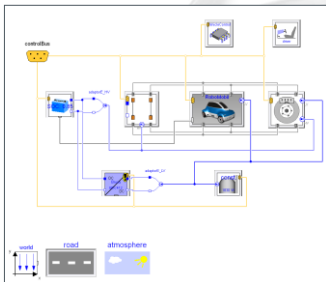
PowerTrain Library 2.1

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

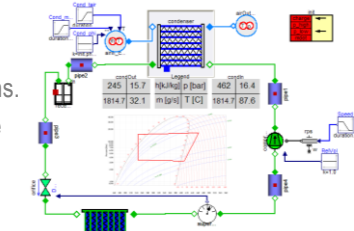


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Other Library Enhancements

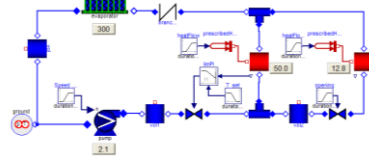
AirConditioning Library

- 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



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