



# Dymola 2021x

Overview of new features

27 November 2020

**3DEXPERIENCE®**

 **DASSAULT SYSTEMES** | The 3DEXPERIENCE® Company

## Executive Summary

### Editing and user interface

- Select which signals to hide and expose when importing FMU
- Routing connections around components
- On popular request: dark mode

### Simulation

- Equation dependency graph for simulation analysis
- Static simulation up to 2x faster

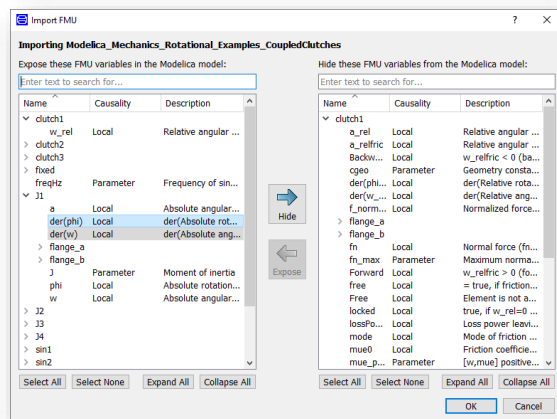
### Libraries

- Modelica Standard Library 4.0.0

## Editing and user interface

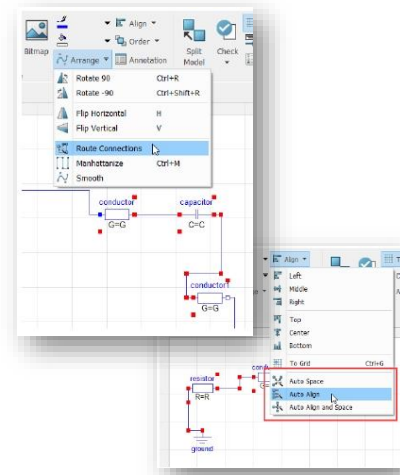
## Functional Mock-up Interface

- ▶ FMU import
  - ▷ Select which signals to hide and expose when importing
  - ▷ Select package where to insert FMU wrapper model
- ▶ Directional derivative (co-sim)
  - ▷ List input, output, exposed state, and exposed state derivative value reference and names in model
- ▶ Linearize FMU
  - ▷ Select time and calculate ABCD matrices



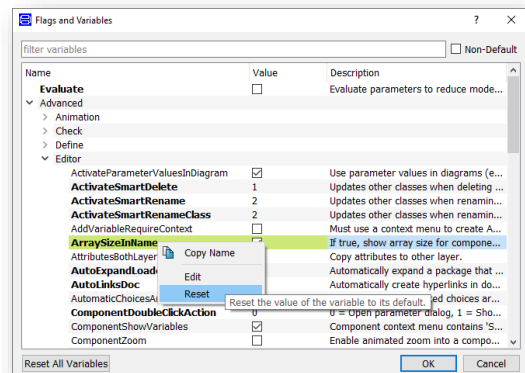
## Graphical model editing

- ▶ Routing of connections
  - ▷ Routes connections around components
  - ▷ Tries to avoid other connection lines
  - ▷ Can be automatic or manual, see Tools>Options
- ▶ Arrange to ensure spacing and alignment of components



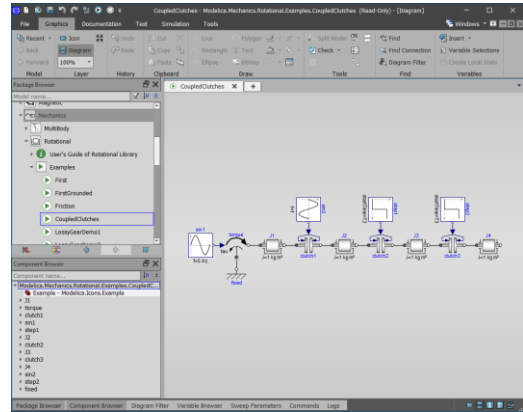
## Variable setting dialog

- ▶ Dialog for setting flags has been extended with all global variables
  - ▷ Boolean flags, numbers and strings
  - ▷ Context menu has Reset option
- ▶ Variable status
  - ▷ Variables in **bold** font are saved between sessions
  - ▷ Yellow background indicates non-default setting



## User interface in general

- ▶ Drag multiple result files into Dymola window to load them
- ▶ Dark mode user interface
  - ▷ Command line option `/dark`
- ▶ Browsers and other docked windows easily enabled or disabled
  - ▷ Buttons in the status bar



Package Browser   Component Browser   Diagram Filter   Variable Browser   Sweep Parameters   Commands   Logs

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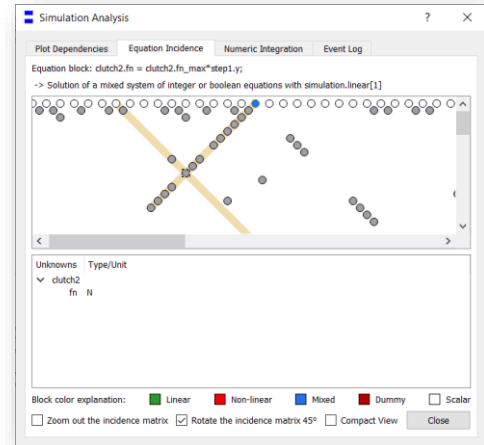
## Simulation

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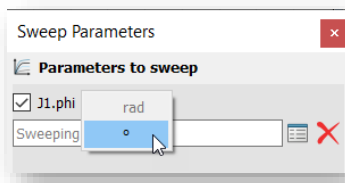
## Equation incidence

- ▶ Equation dependency graph for simulation analysis
- ▶ Show all variables in an equation system
  - ▷ Kind of equation system
  - ▷ Including discrete and torn variables
- ▶ Alternative views
  - ▷ Zoom in, zoom out
  - ▷ Rotate view
  - ▷ Compact view (trivial systems combined)



## Simulation

- ▶ Improved user interface for sweeping parameters
  - ▷ Redesigned dialog for improved clarity
  - ▷ Select unit on parameters
- ▶ Improved performance of static simulation
  - ▷ Lsodar, Dassl, Euler, or Rkfix solver
  - ▷ Set the stop time same as the start time (typically 0 to 0)
  - ▷ Up to 2x faster, depending on model
- ▶ Improved logging
  - ▷ Shorter messages for nonlinear eq. sys
  - ▷ Select what kind of event to log (time, state, or step events)



## Plotting and tables

- ▶ Several improvements of plotting
  - ▷ New Layout ribbon tab to collect all layout and diagram ordering operations
  - ▷ Easier to create new multi-diagram plot windows
- ▶ Tables of simulation result data
  - ▷ Color-coded tables that shows relative magnitude of data in the table
  - ▷ Several color schemes available

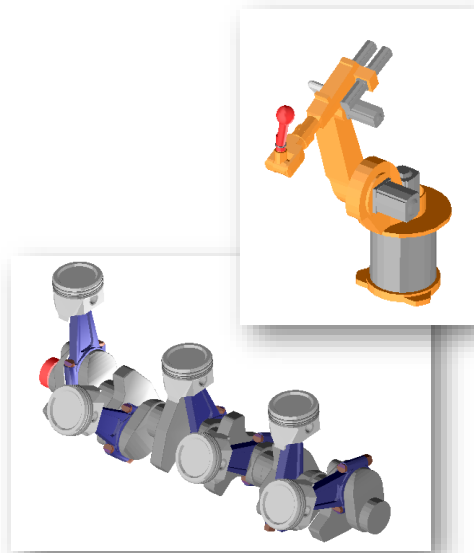
The screenshot shows a 'Table [\*]' window with a grid of numerical data. A context menu is open over the table, showing options: 'Copy Entire Table', 'Copy All', 'Time Unit', 'Independent Variable', 'Color Map', 'Locked', and 'None'. The 'Color Map' option is expanded, showing sub-options: 'None', 'Rainbow', 'Blue', 'Heat', and 'Colormap'. The 'Rainbow' option is currently selected.

	0	0.0024	0.0048	0.0072	0.0096	0.012	0.0144	0.0168
31. w [rad/s]	0	9.976904	9.955561	9.934219	9.912876	9.891533	9.870190	9.848847
32. w [rad/s]	0	0.822399504	0.84799967	0.87359984	0.89919999	0.92479967	0.95039933	0.97599899
33. w [rad/s]	0	-6.140921e-16	-8.591949e-16	2.317590e-15	1.6337912e-15	2.5533113e-15	2.6922908e-15	1.1102223e-14
34. w [rad/s]	0	-0.079049e-16	-0.4461473e-16	2.3373125e-15	1.6496267e-15	2.3858105e-15	2.7313228e-15	1.5614326e-14

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## Animation window

- ▶ Improved lighting model for animation
  - ▷ Gives more even and natural colors
  - ▷ Possible to adjust the ambient light
- ▶ Old style lighting model is available  
`Advanced.Animation.ExtendedLighting=false`



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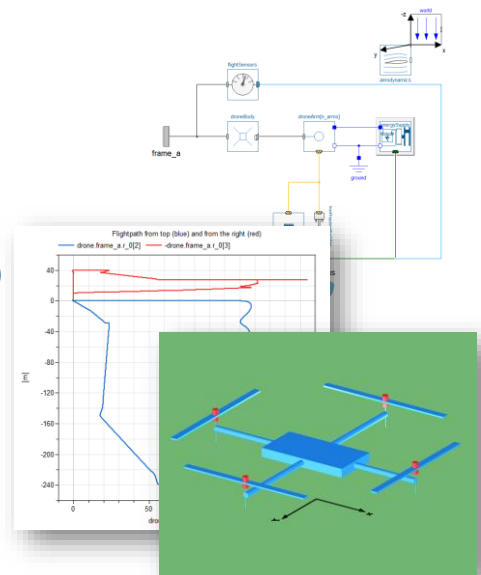
## Libraries and environment

## Modelica Standard Library 4.0.0

- ▶ Major new release of the Modelica Standard Library
  - ▷ Based on the recent Modelica Language Specification 3.4
  - ▷ Many improvements, bug fixes, clarifications
- ▶ Modelica.Clocked
  - ▷ Clocked systems fully supported by Dymola and now part of MSL
  - ▷ Was previously Modelica\_Synchronous
- ▶ Migration
  - ▷ Automatic conversion of models when you open them in Dymola
  - ▷ All in-house and partner libraries migrated from 3.2.3 to 4.0.0
  - ▷ MSL 3.2.3 is available as a separate download if needed

## Aviation Systems Library (AVY)

- ▶ Propulsion and aerodynamics of aircraft
  - ▷ Longitudinal dynamics of airplanes (fixed-wing)
  - ▷ Full dynamics of multi-copter drones (rotating-wing)
- ▶ Designed to connect to other libraries
  - ▷ Electrified powertrains
  - ▷ Multi-body library
  - ▷ Uses standard MSL physical connectors



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## Environment and licensing

- ▶ Dassault Systèmes license server
  - ▷ Available as an alternative to FLEXnet
  - ▷ Must be specified when you order license keys
  - ▷ FLEXnet is the default license server
- ▶ Dymola User Manual
  - ▷ Combined file also available
  - ▷ Makes searching easier
- ▶ Clarification of license conditions for code export
  - ▷ For the avoidance of doubt, internal use shall include redistribution of the Output File as embedded into Customer's products, but shall exclude redistribution of the Output File alone.
- ▶ OLE for Process Control (OPC)
  - ▷ No longer supported as a built-in feature
  - ▷ Contact support if you need an alternative

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